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DETROIT

Automotive Daily News

★CARS★ SHOP EQUIPMENT TRUCKS ★★AVIATION★★ PARTS ACCESSORIES ★TIRES★

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Chevrolet Fleet Sales Top First Half of Last Year By 9.4% And 1929 by 71%

Increase Already Recorded Over Previous Years Expected to Be Maintained Throughout 1931

DETROIT, July 23.—A survey of Chevrolet fleet sales for the first six months of the year discloses that during this period fleet sales increased 9.4 per cent. over the same period last year.

The gain over the first six months of 1929 was 71 per cent. and came within 2,000 units of equalling the figure for the full year.

The gain already recorded this year over previous years is expected to be maintained throughout 1931, in line with the domestic sales expectations recently expressed by H. J. Klingler, vice-president and general sales manager.

Not only have sales of fleet units gained this year over previous half years, but the number of fleet users likewise has increased until today practically every large fleet operator in the county numbers Chevrolets among his equipment, according to Sidney Corbett, manager of the commercial car division.

Among the largest users are the United States government, public utility, tire and rubber, packing house, telephone, telegraph and express companies. Of nearly 500 users of Chevrolet fleet equipment, seventy-three have purchased 27,605 units to date, Mr. Corbett said.

BRYCE, OF N. A. C. C., PROPOSES MORATORIUM ON TRAFFIC MISHAPS

NEW YORK, July 23.—Calling attention to the fact that highway accidents cost the American people annually more than four times the amount of money involved in the current proposal for a moratorium on international dept payments, Stephen D. Bryce, Jr. of the National Automobile Chamber of Commerce urged that steps be taken immediately to meet the situation. The talk was delivered this afternoon over Station WJZ of the National Broadcasting Company.

Intelligent co-ordination of engineering, educational and legislative enforcement activities was advocated by the chamber's representative as one method whereby traffic conditions might be improved.

Quoting from recent surveys which indicated that carelessness and recklessness last year on the part of the motorist and pedestrian were the principal causes for accidents, Mr. Bryce asserted that this situation places the challenge for improving the highway situation directly up to each individual.

"In proposing a moratorium on this stupdendous dissipation of our national wealth through carelessness and recklessness, I recommend

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OAKLAND'S SHUTDOWN FOR VACATIONS, JULY 25

Pontiac, Mich., July 23.—All plants and departments of the Oakland Motor Car Company will close July 25 for the annual vacation period, which will last until August 10.

The company inaugurated the policy of scheduling all vacations at the same time last summer and found the arrangement so satisfactory it is being repeated.

No Summer Shutdown Of Chevrolet Plants

DETROIT, July 23.—Chevrolet Motor Company, division of General Motors Corporation, will not shut down during the summer months this year, President W. S. Knudsen said today.

"We have no plans for a summer shutdown. Our inventory is taken in October and November of each year," he said.

CADILLAC MORE THAN DOUBLES SHIPMENTS OF JULY LAST YEAR

DETROIT, July 23.—For the first 20 days of July, Cadillac and LaSalle shipments showed an increase of 116 per cent. over those of the corresponding period of last year.

A feature of the record is the showing made by La Salle. This car accounted for 53 per cent. of all units shipped. More than six times as many La Salles were shipped in the first 20-day period of this July than in the same period in 1930.

The Cadillac V-8 also made a favorable showing by accounting for 25 per cent. More than twice as many Cadillac V-8's were shipped in the first 20 days of July, 1931, than in the same period of July, 1930.

Cadillac-La Salle shipments have consistently shown gains this year as compared with last, but the 116 per cent. mark is the highest to date. June's increase was 39 per cent.

CANADIAN PRODUCTION FOR JUNE, 5,583 CARS, 1,252 TRUCKS, A DECLINE

OTTAWA, Canada, July 23.—Production of automobiles in Canada during June numbered 6,835 cars, including 5,583 passenger cars and 1,252 trucks. This output was at the rate of 228 cars per day and compared with a daily average of 411 cars in May and 503 cars per day in June of a year ago.

Comparison of this month's figures with those of the previous month shows that the decline was general for all types of cars, passenger cars dropping to 5,583 from 10,621 and trucks to 1,252 from 2,117, according to the monthly report on automobile production issued by the Dominion Bureau of Statistics.

The bureau's index number of motor car production, which is adjusted for seasonal variation and expressed as a percentage of the long term trend determined from the period of 1919 to 1928, inclusive, which started in January at 60 per cent. below the normal, gradually improved its position each month to register its high for the first half

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SOUTHERN JOBBERS CHOOSE ATLANTA FOR NEXT SESSION

Asheville, N. C., July 23.—The Southern Automotive Jobbers' Association ended its three-day session here yesterday with the decision to meet at Atlanta in February. Officers will be elected at this meeting.

CAR MAKERS DIFFER ON PRICE INCREASE POSSIBILITY

Two Leading Indiana Manufacturers Express Divergent Opinions on Question Asked by A. D. N.

INDIANAPOLIS, July 23.—Answering the question of the Automotive Daily News regarding the probability of increases in the prices of passenger cars within the next few months, the two leading Indiana manufacturers of cars expressed somewhat divergent opinions.

G. M. Williams, president of Marmon, believes that rising materials costs will tend to lift car prices. Col. Gorrell, president of Stutz, believes that internal economies in automotive plants have placed the companies in a position to meet higher costs for materials and still maintain present price levels.

The opinions of these two manufacturers are as follow:

Internal Economy Will Prevent Price Lifts

By Col. E. S. Gorrell
President of Stutz Motor Car Co.

In my opinion there isn't going to be any price increases of any material size, even though the cost of material does go up, for the reason that all of us who are manufacturing cars have been forced by necessity to learn how to run our plants with greater internal economy than was formerly the case. It is my opinion that this greater internal economy will enable us to stand an upward turn of the cost of material without increasing the price to the public.

Higher Prices May Come Next Year

By G. M. WILLIAMS
President Marmon Motor Car Co.

Present price levels of automobiles of course depend largely upon the costs of material and labor. Nevertheless, there is the factor which has had a bearing during the

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3,000 CARS INSPECTED FIRST DAY OF CHICAGO'S "SAFETY LANE" DRIVE

CHICACO, July 23.—Chicago's first "safety lane" campaign, a city-wide drive with seven lanes in operation simultaneously, is proving a success, according to a check made at the Chicago Automobile Trade Association headquarters. More than 3,000 passenger car and truck drivers took advantage of the free inspections the opening day of the campaign.

That the second day attendance would be far greater than on the first day seemed assured as a result of a tour about the various safety lanes. At each point a line of vehicles, in some cases extending two blocks, awaited the inspectors at the opening hour of 8 a. m.

Those in charge of the campaign agree that the idea has gone over with the motoring and truck owning public here. They are confident that each day will witness a steadily mounting attendance until it reaches capacity, and there is already talk of continuing the drive into its second and possibly third week.

Although declared to be satisfactory, the attendance on the initial day of the drive did not tax the facilities of all the lanes. This is

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Late News Flashes

South Bend, Ind., July 23.—Neither Studebaker nor Pierce-Arrow, its subsidiary, will close this summer for vacations, it was announced here today by H. S. Vance, vice-president of Studebaker.

* * *

Auburn, Ind., July 23.—Roy Faulkner, president of Auburn, stated today that his organization will not shut down any of its plants, either at Auburn or Connersville, for summer vacation.

* * *

Pontiac, Mich., July 23.—Directors of the American Forging and Socket Company have declared the regular quarterly dividend of 15 cents per share, payable August 1 to stock of record July 17.

* * *

Detroit, July 23.—L. G. Peed, general sales manager of De Soto, today announced the appointment of K. Ray Spencer as district manager in Kansas City. Spencer has served in similar capacity for other Chrysler divisions.

* * *

Detroit, July 23.—Federal Motor Truck will not close this year for summer vacations, it was announced here today.

Sales of New Commercial Cars for June Down 18%

NEW YORK, July 23.—Retail sales of commercial cars in June in the domestic market approximated 27,500, according to an estimate made by Automotive Daily News on the basis of the registration returns from seventeen states and the District of Columbia. This estimated total compared with 33,489 units in May and 33,515 in June of last year.

The seasonal falling off from May, on the basis of the estimate of 27,500 for June, was 18 per cent., and the decline from June of last year was approximately the same. It is noted that May sales this year were only twenty-six units below the registrations of June, 1930.

Registrations of new commercial cars in the seventeen reporting states and the District of Columbia in June amounted to 7,936, as against 9,624 in the same states in the preceding month, a decline of 17.4 per cent., and comparing with 9,493 in June of last year, a falling off of 16.4 per cent.

The registrations in these states in May accounted for 28.8 per cent. of the total for the month, and in June, 1930, their share was 28.3 per cent. of the total. It can be assumed, therefore, that their total for June of this year will run from 28 to 29 per cent. It is on this basis, after allowance for the declines from May of this year and June, 1930, that the estimate for June of this year is made.

The estimated June total brings the registrations for the first six months of this year to 176,240, as compared with 228,024 in the corresponding period of 1930, a decline of 22 per cent.

The following table compares the new commercial car registrations in

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Dealer Shares Responsibility, Returns With Salesmen

See Page 3

$52,827,797 Net Earnings Of G. M. in Second Quarter

NEW YORK, July 23.—Alfred P. Sloan, Jr., president General Motors Corporation, announced today that net earnings of the General Motors Corporation for the three months ended June 30, 1931, including equities in the undivided profits or the losses of subsidiary and affiliated companies not consolidated, were $55,122,767. After deducting dividends of $2,343,970 on the prefered stock, there remains $52,778,797, or the equivalent of $1.22 per share earned on the common stock outstanding.

This compares with operating earnings of $53,386,768 for the second quarter last year, which, after deductions for preferred dividends, left $50,976,626 available for the common stock, or the equivalent of $1.17 per share. However, these latter figures do not include a non-operating, non-recurring profit of $9,517,943, resulting from the sale to General Motors Management Corporation of 1,375,000 shares of common stock of the General Motors Corporation Thus, total earnings for the second quarter last year, operating and non-operating, were $60,963,841, or the equivalent of $1.34 per share on the total common stock outstanding.

Net earnings for the six months ended June 30, 1931, were $84,122,176, or the equivalent, after the deduction of $4,687,539 for dividends on the preferred stock, of $79,434,637, or $1.83 per share on the common stock outstanding.

This compares with net operating profits of $98,355,355 for the first half of last year, or the equivalent, after preferred dividends, of $2.15 per share on the common stock. Total net earnings, operating and non-operating, were $105,932,428 in the first half of last year, or the equivalent, after preferred dividends, of $2.32 per share on the common.

Cash, United States government and other marketable securities at June 30, 1931, amounted to $245,856,668, as compared with $179,037,071 at December 31, 1930, and with $175,693,782 at June 30, 1930. Net working capital at June 30, 1931, amounted to $328,651,750, compared with $281,037,636 at December 31, 1930, and with $290,577,234 at June 30, 1930.

Attention is called to the fact that the financial position of the corporation has not only been maintained during the period but has been materially strengthened. Cash and cash items were approximately $70,000,000 greater than at the close of the period a year ago and approximately $66,860,000 greater than at the end of December of last year. Net working capital position likewise has been substantially improved.

During the second quarter ended June 30, 1931, General Motors dealers in the United States delivered to consumers 361,683 cars, compared with 371,139 cars in the corresponding quarter of 1930. Sales by General Motors operating divisions to dealers in the United States for the second quarter amounted to 369,677 cars, as compared with 356,129 cars in the corresponding period of 1930. Total sales to dealers, including Canadian sales and overseas shipments, amounted to 419,650 cars, compared with 395,584 cars in the corresponding quarter of 1930.

For the six months ended June 30, General Motors dealers in the United States delivered to consumers 593,564 cars, compared with 657,829 cars in the corresponding period of 1930. Sales by General Motors operating divisions to dealers in the United States amounted to 625,674 cars, as compared with 679,572 cars in the first six months of 1930. Total sales to dealers, including Canadian sales and overseas shipments, amounted to 724,197 cars compared with 764,219 cars in the corresponding period of 1930.

From the above statistical statement of the operations of the corporation it will be noted that the

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Indiana Car Makers Differ On Price Boost Possibility

(Continued from Page 1)

past year in the more or less continued liquidation of inventories by both dealers and manufacturers, thus causing lower levels than would otherwise be the case. I cannot see any indications of higher prices during the balance of this year, but if there is a substantial stabilization of material prices early next year, I am inclined to think that it will rapidly have a bearing on prices of cars.

Detroit Leaders Are Interested In Price Increase Discussion

DETROIT, July 23.—Considerable interest has been aroused here by the opinions lately published in Automotive Daily News from leading manufacturers in the passenger car field as to the probability of price increases within the next few months.

A number of manufacturers have privately amplified statements made for publication and several others who did not care to say anything for publication at this time have been perfectly willing to talk under pledge of not being quoted.

There are several well defined lines of thought with regard to the matter. One opinion held by several presidents of manufacturing companies is that rising materials costs, which they regard as inevitable early in 1932 if not sooner, will bring upward revision of car prices. The other school of thought inclines to the belief that increased plant efficiency, learned under the stress of depression, will enable manufacturers to stick to present price levels, even though materials costs go up.

One manufacturer very frankly said that he believed present price levels were too low; in some cases prohibiting companies from showing adequate returns on their investment. At the same time he doubted that manufacturers would be able to raise prices in the face of public reluctance to buy. This well known company head could see increased production, coming with general business improvement, as the only hope on the horizon.

BRYCE, OF N. A. C. C., PROPOSES MORATORIUM ON TRAFFIC MISHAPS

(Continued from Page 1)

for your guidance but one principle—the "Golden Rule of the Road." Just remember to accord to the other fellow whom you encounter in your daily travels the same courtesy and consideration which you expect from him and you will have done your part," declared Mr. Bryce.

D. W. McCORMICK DIES, CHICAGO OLDS OFFICIAL

Chicago, July 23.—Donald W. McCormick, for seven years vice-president and general manager of the L. Markle Company, Oldsmobile dealership on Michigan Avenue's automobile row, died recently after a brief illness. Burial was at Birmingham, Ala., Mr. McCormick's former home.

3,000 CARS INSPECTED FIRST DAY OF CHICAGO'S "SAFETY LANE" DRIVE

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accounted for by the fact that drivers had not quite got the idea behind the campaign; namely, to provide free inspections and apprise drivers of the mechanical condition of their cars from the standpoint of safety.

It was found that drivers became more anxious to have their cars and trucks inspected as they saw others taking advantage of the same privilege along heavily traveled thoroughfares, including the south side outer drive along the lake front.

Fourteen men are on duty, two at each of the seven stops where inspections are made, so that a total of ninety-eight workers furnish the man power for the seven "safety lanes." In addition, several are in reserve at each lane for purposes of relief during lunch hour.

Incomplete tabulations, which, nevertheless, are sufficient for striking averages on the first day's results, show that between 15 and 20 per cent. of the vehicles received "O. K." cards. It was also found to the surprise of those in charge that there were more cases of defective lights than any other trouble, even including inefficient brakes.

CANADIAN PRODUCTION FOR JUNE, 5,583 CARS, 1,252 TRUCKS, A DECLINE

(Continued from Page 1)

of this year at 26 per cent. below the normal in April, then dropped back in May and again in June, when it registered the low of 68 per cent. below the normal.

Customs' records for the month under review showed that 647 cars were imported into Canada and that 1,084 cars were exported during the period. Figures for the first six months of this year showed total imports at 7,558 cars and exports at 10,451 cars, as compared with imports of 16,544 and exports of 23,795 cars during the corresponding period of last year.

Of the total output during June 5,720 cars were made for sale in Canada and the balance of 1,115 were intended for export. The apparent consumption of automobiles during the month, determined by adding the 5,720 cars made for sale in Canada to the 647 cars imported, amounted to 6,367 cars. The number of new cars made available for use in this country during the six months ended June 30, 1931, totaled 64,341 cars, as compared with 103,009 cars in the first half of 1930.

WESTINGHOUSE TO BUY COMBUSTION CO., REPORT

New York, July 23.—Reports in Wall Street yesterday that the Westinghouse Electric and Manufacturing Company had completed an audit of the books of the International Combustion Engineering Corporation, looking to the purchase of all or a part of the properties, could not be confirmed.

There were indications that some consideration has been given to a transaction of this kind, but that no plan or offer had been made.

The report of the receivers for the International Combustion Engineering Company for the period December 19, 1929, to December 31, 1930, shows a net profit from operations, before depreciation, of $1,223,240, and total income of $1,560,885. After interest, depreciation of $1,363,800, royalties, amortization, special expenses of receivership and foreign income taxes the net loss carried to surplus was $662,229.

AMERICAN FORGING-SOCKET DECLARES USUAL DIVIDEND

Pontiac, Mich, July 23.—Directors of the American Forging and Socket Company, making automobile parts, have declared the regular quarterly dividend of 15 cents per share on outstanding common stock, payable August 1 to stock of record July 17.

SPARKS from DETROIT

Should Celebrate

* * *

Loss of Memory

* * *

The Late Harry Branstetter

Chris Sinsabaugh—Detroit Editor

JUST quoting because the idea advanced makes it look possible for me to consistently ask for a day off tomorrow to properly celebrate an anniversary I knew nothing about until it was called to my attention by Herbert Buckman, manager of the Cleveland Automobile Manufacturers' and Dealers' Association:

"Are you arranging any special observance or celebration for Saturday?" writes the aforesaid Buckman. "That is St. Christopher's Day and it seems to me that you are under the protection of that sturdy saint in at least two respects. Obviously you bear his name, and furthermore, as the patron saint of motorists (as of all travelers), it is in his vineyard that you have labored for so many years as traveler and writer about travel. It is almost as happy a circumstance as those surrounding that other noted traveler similarly named, to whose voyaging we are indebted for the land of the free and the home of the brave.

* * *

"I FOUND it intensely interesting about a year ago to make research into the activities of St. Christopher and how he came to be recognized as the patron saint of us automobile folk. The increasing interest in St. Kit is remarkable; for instance, there is a string of automobiles every Sunday waiting to be blessed at St. Christopher's Church in Rocky River village, just near Cleveland. Medallions are found in more and more cars. It was, of course, while carrying on that research that I found July 25 to be St. Christopher's Day, and why I am writing you now.

"It is another opportunity to wish you well—to express the hope that long may you wave and continue to charm and interest us with sparks and embers of reminiscence from the town that owes so much to the saint whose name you most appropriately bear."

* * *

IN THE same mail with the Buckman letter came one from my good friend, Hugh Goodhart, advertising manager of Franklin, which leaves me out on a limb. I wrote a story about Lew Miller having driven a Chrysler Imperial from San Francisco to New York and back to Los Angeles in 167 hours, 59 minutes in 1927, setting up a round-trip coast-to-coast record. Reading it, Goodhart counters with:

"We here at Franklin always read your 'Sparks From Detroit' with a great deal of interest, and your reminiscences of the old days in the industry have more than ordinary appeal since Franklin is the fifth oldest manufacturer of motor cars in this country. But"——

And then he goes on to tell me of how Cannonball Baker, in a Franklin Airman sedan, in 1928 drove from Los Angeles to New York and return in 157 hours, 23 minutes for a round-trip coast-to-coast record.

The ayes seem to have it, but why blame the poor column conductor for loss of memory? If the A. A. A. would only certify these performances we would have them down in black and white, but, of course, Tom Henry's organization cannot do this because it would be accused of encouraging the breaking of speed laws. There still are some states which object to the wide-open throttle.

* * *

NO ONE worked harder in the promotion of those automobile contests that made Chicago famous in the days when it was necessary to prove the endurance, reliability and speed of the motor car than the late Harry Branstetter, news of whose sudden death came Tuesday. For years he sold Kissels, and when he wasn't doing that he was most active in the staging of the Elgin road races, the Algonquin hill climbs, the strenuous five-day reliabilities and the fuel tests, along with Dave Beecroft, Win Zucker, R. A. Wadsworth, Dick Wolfe, Joe Lawrence, Mort Luce, Arthur Robbins, George Ballou, Cliff Ireland, Charley Root, Joe Gunther, J. C. Zimmerman and others. When Lloyd Maxwell started the Old Timers' Club as a national organization, of which the late Albert Champion was first president, Branstetter was most active, particularly in handling those famous reunion banquets at show time. And, before the club wound up, Branstetter served a term as president.

Maintain Buses by Complete Rebuilding if Necessary

Worcester, Mass., Street Railway Hasn't Scrapped Coach Bought New Since First Was Run in 1926; One Has Covered 266,739 Miles.

BUS maintenance as practiced by the Worcester Consolidated Street Railway Company of Worcester, Mass., includes the complete rebuilding of coaches when needed.

Coach No. 16 holds the record for the company, having gone a total of 266,739 miles. Of course, it has been practically rebuilt, but that is why the operating concern employs a staff of body builders and painters.

On the second floor of the Market Street garage is a completely equipped car shop. Three buses can be reconditioned at one time.

The Worcester Consolidated Company first started running buses in 1925, when it bought out some private operators. The equipment was used temporarily, but it didn't meet the requirements of the company, and some of the buses were junked and others have been converted into other uses.

It bought its first allotment of buses in 1926, and No. 16 is one of this lot. Since then new coaches have been added from time to time until now the company had sixty-five of various sizes, ranging from twenty-five-passenger to thirty-eight-passenger. They are housed in the garage on Grove Street, and it is there that the motors are cared for. The frame and body work is done at Market Street.

It is a large staff that the company maintains to keep this automotive equipment in operation. "We've got thirteen mechanics spread over three shifts at the garage," says Angus J. MacPherson, master mechanic, "and they've got ten helpers. There are two welders who work on coaches. We have twelve carpenters, two upholsterers and a helper, six painters and two electricians."

Questioned on the life of a bus, Mr. MacPherson says: "We don't know, because we've never scrapped one that we bought new."

"It's just a matter of cost with us," he explained. "If it would be cheaper to buy a new bus than recondition an old one, we'd buy a new one. So far that has never been the case."

The company maintains three or four different types of buses, and for each type an extra motor is kept ready. If a motor needs an overhauling or a major repair job, the bus is driven under a big crane at the garage and the motor is disconnected and unbolted from the frame and lifted out. The emergency motor is lifted in, connected and the bus is back in operation while the garage men tear down the other motor and put it back in perfect condition.

When the bus has concluded the day's run, explained Mr. MacPherson, the operator drives it up to the gasoline tank at the garage, shuts off the motor and leaves it. He then goes in and makes out his report for the traffic department, counts up his receipts and fills out his reports. Among these reports is one on the coach. If there is a noise in the motor, a door that sticks, a brake that is out of adjustment, a windshield wiper that doesn't move fast enough, or a horn that needs adjustment, on the report it goes and the garage men are charged with fixing it.

If it is a major defect that is reported, the night men put that bus to one side and the operator gets another in the morning, while the day garage men take the bus apart to see where the trouble is.

Gasoline, oil and water go into the buses before they are put up for the night. Last month 44,760 gallons of gasoline and 17,273 pints of lubricating oil were used.

The garage men also keep an eye on the tires. If one is in need of replacement, the wheel comes off, a spare wheel with a tire all mounted goes on and the old tire and wheel go to the tire dealer for reshoeing. The average life of the bus tires is 35,000 miles. Last year 340 tires were used.

Every 1,000 miles a bus is given an inspection and lubrication and is washed. If it is reported as dirty by the operator, and the inspector agrees with him, it is washed anyway. The inside of the bus is swept out every night.

When the 2,000-mile mark is reached the bus is given a careful inspection. Every 90,000 miles the bus is taken out of service, brought down to the Market Street garage and overhauled. The motor is thoroughly overhauled at the garage.

An overhauling is just that, too. The motor is torn down, new sleeves are put in the cylinders, bearings are replaced, pistons are replaced and new rings put on—in fact, anything might happen to that motor. As to the bus itself, it comes apart. The seats come out, the dash comes off, the metal paneling on the sides is taken off, the frame inspected.

Then the bus is reassembled. Maybe it will have a new dashboard, with two or three sections of metal paneling replaced, a section is welded in a weak part of the frame, all joints are soldered up, the paint is scuffed down and the coach is turned over to the painters looking like a patchwork quilt.

They then get their sprays working on some Monday morning. By Friday night a shiny yellow bus with a cream-colored top, red stripes and the neat red wording on the side, "Worcester Consolidated Street Railway Company" is the result. Inside, reupholstered seats, the woodwork has been "done over" and the floor is a clean dull red.

Dealer Considers Salesmen Most Important Factor for Success; Results Back Idea

Walker Motors, Highland Park, Mich., Puts Every Employee in Position of Head of Firm, Giving Him Share in Returns for Responsibility

THE most important factor in the automobile business from the dealer's point of view is the attitude of his individual salesmen, in the opinion of Thomas H. Walker, president of Walker Motors, Inc., Hudson and Essex dealer of Highland Park, Mich.

Mr. Walker speaks with assurance. During the ninety-day period ended July 1, Walker Motors delivered 355 cars and exceeded the record for the similar period in 1930 by sixty-nine cars. Its president finds no time to worry about business recessions, and spends even less in discussing them.

"Too often the automobile salesman is intrusted with too little responsibility," says Mr. Walker. "He is kept in the dark about the business of his organization, and, consequently, finds it hard to be really interested in his job. No man working under these conditions and lacking a clear conception of the final result of his activity can give his best effort to his work.

"Every salesman with Walker Motors is placed in the position of an individual dealer. He accepts the responsibility and shares the return. He responds to the fluctuation of the business just as much as any member of the organization from the president down. His earnings represent a share of the profits. We want him to have the idea that Walker Motors pays the overhead, but that each man is in business for himself.

"That's exactly the way it works out," continues Mr. Walker. "There are no secrets in this organization. We have a sales meeting every morning, at which time the records of the business are discussed and suggestions exchanged. Each man receive a detailed report of his daily transactions from the secretary of the company. The result is that each man is as interested and as careful in his dealing as I would be myself. That makes for contentment and efficiency in a sales force.

THOMAS H. WALKER

"Moreover, it distributes the selling effort over an entire transaction. Each man knows that a used car taken in trade must be advantageously disposed of to make the sale successful, so he guards against careless trade-in allowances. An appraiser not only estimates the value of a used car, but estimates the amount of repairs necessary for a resale, and figures it against the allowance. If the car is later disposed of with no loss, the salesman is awarded a bonus. If it can be sold at a profit, he receives half the profit in addition to the bonus. The system gives perfect co-ordination in the movement of new and used cars."

Offering these opportunities, it is not hard to find good salesmen, nor to keep them busy and consistently successful, Mr. Walker believes.

"The bugbear of good business is the perfunctory method of hiring and firing practiced by many executives, who make no attempt to build up their employees," he said. "In the automobile business the secret of success is to be found in the accumulation of prospects, plus the intelligent selling of the product. No man who has been shunted from position to position, with little opportunity to learn his line, can be expected to be immediately a good salesman.

"We aim to make every man personally concerned with the fortunes of Walker Motors. We teach him that he represents not only our organization, but also the Hudson Motor Car Company. We encourage him to become as well acquainted with the factory as he is with us. Then we tell him to go to it. Given an attractive showroom, a complete display of cars and an adequate service department to back him up, we find that he generally justifies our confidence."

Mr. Walker still employs the service manager who created the department when he became a Hudson and Essex dealer in 1927. His assistant service manager is the same. Nine of the twelve men on his sales force have been with him continuously since he entered the business.

Better Sales Development Today's Outstanding Need, Head of M. E. A. Declares

PRESIDENT E. T. SATCHELL of Motor and Equipment in the July issue of M. E. A. Leader declares today's greatest need to be better sales development.

He says there is far too much of a tendency to think that jobbers are most concerned with sales development when manufacturers face just as vital a need for better sales promotion knowledge. His views follow:

"Recognizing that the scientic application of American initiative and energy has advanced our productive capacity far beyond the ability of our sales forces to absorb our vast output through consumer demand, it is evident that we have reached a time when our best application must be directed toward market studies and development. Not that we have reached anything approaching the limit so far as production is concerned. Science will continue to apply itself to bigger, faster and greater machines. We are up against the adverse results of such achievement unaccompanied by similar accomplishment in sales. Ruination lies at the bottom of turning out more goods than can be absorbed. Fundamentally the whole structure of production rests on the absorption factor—the consumer.

"In my opinion, the months and years immediately ahead are going to be devoted to an intensive study of markets, national and worldwide. We are going to discover vast quantities of information about the consumer that never before was widely known, and much less appreciated.

"There is a constant increase of scientific attention being directed toward all kinds of markets, as witness the growing number of agencies exclusively devoted to ascertaining marketing facts, and the number of firms setting up market research departments.

"In a new country whose people have a psychological drive that is different from that of the citizens of other lands, with boundless natural resources and possessed of a vast land and water territory that as yet is still far from being overpopulated, it was natural that production, transportation, banking, credit and other phases of manufacturing and commerce should receive attention to an extent and a degree greater than market development, vast as that undoubtedly has been.

"But now, because of many factors that need not here be gone into, a present state of inertia exists, the outstanding danger of which, in my opinion, lies in the attitude that 'business is rotten and why try to hunt for what doesn't exist!'

"There is business, but we as a people first have to do two things in order to get it: we've got to cease the pessimistic trend of our thought, and the best way to get rid of the commercial blues is to quit a state of mental idleness and arise and shake ourselves by getting occupied very busily with such a concentrated study of consumer markets as never before has been instituted.

"Only a fool would proclaim that there's little or nothing more that we can learn about our markets. I believe that what we will come to know about this vital subject during the next ten years will cause us to look back with astonishment at the way we went after business prior to 1931. A lot of things we've been doing haphazardly simply because we have yielded all along to the traditional pull historically behind such methods, we will do entirely differently in even the next few years.

"Coming within our own membership there is far too much of a tendency to think that it is our jobber members who are most concerned with sales development. As a matter of fact our manufacturers face just as vital a need for better sales promotion knowledge as do our wholesalers. They are practically at the mercy of the purchasing agents just now who are taking merchandise pretty nearly when and how they please.

"However, this is a phase of a transient situation that in time will find a remedy in that closer study of our markets which current conditions will enforce. Naturally, those who won't do the studying will find economic laws operative against them and in due time they may expect to be left out of the commercial picture.

"One of the greatest services which our proposed associations could perform would be to bring together the different groups that would institute such studies as would aid in effecting the legitimately profitable movement of merchandise from raw materials to the finished products in the hands of the ultimate consumer and from A manufacturers right along the line through the B members and on to the wholesalers on their way to the citizens who individually buy and use them.

"Let us look forward to well organized groups, the members of which shall apply themselves to these highly important problems: The sales managers of our manufacturers and wholesalers meeting regularly in conferences established to tackle and think through clearly set up schedules of studies of their respective sales fields. As individuals, these sales managers can't be expected to admit any shortcomings. That would hardly be natural! But invited to foregather regularly as a group for the purpose of discussing their troubles, it is very likely they would welcome the opportunity—and out of such a series of mutual studies would come a growing body of ideas and experiences and a co-operative attitude rather certain to bring desired results.

"If it can be done with purchasing and credit, for example, it can be accomplished for sales development.

"Meanwhile, the manufacturers themselves could meet in different related groups in united adventures toward more enlightenment on common sales problems. In fact, we already have something of this character started with our shop equipment and service tools committees, the purpose of which is to study better ways of merchandising equipment and tools. Such committees can be enlarged as they get under way and produce encouraging results."

M'GARRY HEADS PITTSBURGH MARMON DISTRIBUTORSHIP

Pittsburgh, July 23.—J. B. McGarry has resigned as district manager of the Marmon Motor Car Company for this area and is now president of the Pittsburgh Marmon Company, distributors for western Pennsylvania.

BUICK DONATED AS PRIZE FOR BABY PARADE'S QUEEN

Asbury Park, N. J., July 23.—Arthur C. Steinbach has again donated a 1931 Buick motor car as the prize of Queen Titania XL. in the fortieth annual national baby parade, to be held September 2, Carnival Director Arthur F. Cottrell announced today.

Automotive Daily News

"Of, By and For the Entire Automotive Industry"

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Wanted--A Sense of Humor

"IF THE average automobile dealer in the United States," remarked a well-known automotive merchant the other day, "had any sense of humor, he would laugh himself to death when he looked in the mirror to shave."

Such a statement naturally sounded a bit startling. The faces of earnest dealers that we have scanned within the past few months have contained little suggestion of anything smile-producing, to say nothing of hearty laughs.

However, our friend amplified his original statement. "Any man who has allowed a potentially good business to degenerate into a system of barter and sale, wherein he is usually trading away more than any profit he can hope to make, ought to laugh at himself. I tell you this automobile business ought to be one of the best that there is. It ought to pay a man 10 per cent. on his time and investment. Does it? Ha ha, ask the man who is a dealer.

"I am fully aware that most dealers blame all their troubles on the manufacturers. Heaven knows, I hold no brief for some of the actions that have come from the factories. What I think of some of these performances would have to be written on asbestos. The manufacturers cannot claim immunity from blame for the present mess. But, after all, are we dealers rabbits? Are we morons? Have we got to have some one take us by the hand to lead us across every street we come to?

"Regardless of what the manufacturers do, we dealers have the cure in our own hands. If, to stay in the automobile business, we have to buy sales at a rate of barter that leaves us with a deficit on every new car sale we make, do we show much evidence of brains in remaining in such a business?

"On the other hand, it needs only honest co-operation among dealers to bring the barter side of our business under control that would make the automobile trade the profitable and pleasant one that it ought to be.

"One thing is certain, if we dealers do not wake up and get together to put our business on a sound basis, the factories are going to take a hand. The manufacturers may move in one way or they may act in another, but the end is going to be that dealers will be forced to change their present bartering methods. The factories are going to be reluctant to take any radical step. They will delay as long as possible. We dealers today could do more than the factories ever will, if we would co-operate to revise our bartering."

Which is it going to be, dealer reform from within or paternalistic guidance from the factories in self-defense?

* * *

Savage Justice

THERE is an interesting legal case in the process of making in Indiana. The Chicago Motor Club has decided to carry to the Indiana Supreme Court a fight against the Indiana law which permits justices of the peace to share in costs collected from defendents who have been found guilty. The club will base its fight on the ground of unconstitutionality.

The case on which the appeal is based is one wherein a motorist was fined $1 by a justice of the peace and then assessed $13.70 in costs, the charge being reckless driving. Of the costs his honor took $5, the prosecuting attorney $5 and the constable had to be content with the odd $3.70.

It is scarcely necessary to dwell on the atrocity of such a condition as is indicated. To get his fee the justice must convict. To get his the constable must catch them. The prosecuting attorney is less involved, but, at any rate, he has to get a conviction to get his reward.

This form of mulcting was common in most states in the early days of motoring. Almost every civilized community has done away with the justice of the peace court operating in this way. Indiana, even if the law is held constitutional, will do well to clean house.

Congressman McFadden Favors Co-ordinating Nation's Entire Transport System as Public Need

REPRESENTATIVE McFADDEN of Pennsylvania, chairman of the House Committee on Banking and Currency, last night at Atlanta, Ga., spoke before the Chamber of Commerce on co-ordination of our entire transportation system to best serve the public need. The following is Mr. McFadden's speech, somewhat abbreviated, but in full as it affects motor transportation in the general scheme:

"The comparative state of economic health and soundness of American railroads undoubtedly affects the welfare of more people than any other group of investment enterprises in the world. This is due to the immense capital which has gone into their properties, aggregating about $26,000,000,000, and the practically universal distribution among the population of the ultimate ownership of this capital.

"American railway stocks and bonds are outstanding in the hands of the public to the extent of about $18,000,000,000 (indicating great under-capitalization as compared with the total investment of $26,000,000,000).

"According to the best information obtainable, there are nearly 1,000,000 separate owners of railroad stocks. The number of separate owners of bonds is entirely unknown, but may quite readily be another million. These figures, however, go only a very little way in indicating where ultimate ownership actually rests.

"There is scarcely a person in the United States, regardless of age, income or extent of property ownership, who does not have, either directly or indirectly, a very real interest in the welfare of the railroads.

"Every insurance company, bank, trust company or savings fund is a large investor in rail securities, and hence every depositor, policy holder or insurance beneficiary is indirectly a part owner of the railroads, since his or her funds, present or prospective, consist in part of the securities represented by railroad stocks or bonds."

Mr. McFadden then outlined the important place occupied by the railways in our economic system, both as providers of transportation and as buyers of commodities necessary to make possible their service. He then proceeded as follows:

"The number of cars loaded with revenue freight declined early in June to a level of about 740,000 per week, which represents the lowest figures ever reached since records of car loadings have been kept, beginning with the year 1918, while the number of idle cars has risen to above 600,000, eating up interest at the rate of $50,000,000 to $60,000,000 a year.

"Concurrently, the decline in passenger traffic has been enormous, amounting to over 40 per cent. since 1920. The fact that this is due largely to the use of the private automobile, rather than to the effect of commercially operated buses, does not minimize the necessity for recognizing the severity of the loss involved, and the need for making up for it in other directions where practicable.

"So low have railroad earnings fallen in the first half of 1931 that the status as legal investments for savings funds, trustees, etc., of hundreds of millions of dollars in railroad mortgage bonds is threatened, though they should logically be of gilt-edge character, and their soundness as to both interest and principal beyond question.

"It was to meet these conditions, to protect railroad credit in general, to save their properties from deterioration through insufficient maintenance, and to assure their ability to continue giving the country the transportation servce which is required, that the railroads made their application to the Interstate Commerce Commission for an increase in freight rates.

"Perhaps the most important thing to bear in mind in connection with this application is that it is an emergency revenue measure and not a rate measure. By this is meant that it is a measure deemed necessary by the railroads to protect their earning power at a critical period and to prevent a crisis from developing into a disaster. It is not intended as a permanent rate measure; that is, a long-term readjustment of the rate structure, or a revision of the rate structure upon more scientific lines.

"These are doubtless desirable developments of the future, but the contention of the railroads is, and apparently with justice, that the immediate protection called for in the emergency rate application is necessary in order to give time for subsequent dealing with the fundamentals of the situation in a fundamental and orderly way.

"The railroads, I understand, are not coming before the public with any plea for sympathy or pity. They are not asking that the investment in a recessive industry be bolstered up in order that individuals may be saved from loss. If it were true that the railroads were being superseded by newer and better forms of transportation, then economic law should take its course and the capital losses be borne as best they may. But this is not the situation which confronts us. The railroads are not a recessive industry. In the eight years ended with 1930, the railroads spent approximately $6,750,000,000 upon internal improvement and betterments.

"It is not too much to say that they were rebuilt internally, and these improvements and betterments resulted in the immense economies, and in the enormous increases in efficiency of operations which have given this country, in the last few years, better transportation service with respect to speed, dependability and reliability, both passenger and freight, than it or any other nation ever before enjoyed in history.

"Moreover, in 1929, the latest year for which records are available, the railroads demonstrated their position as the backbone of our transportation system by rendering 90 per cent. of all the ton miles of commercial freight traffic performed in the United States, by all agencies put together, with the exception of the traffic moving on the Great Lakes, which of course have been great avenues of transportation—the gift of nature—for more than a century.

"In other words, despite all of our highways, airways and artificial inland waterways, the railroads still remain supreme, and, as far as we can see, will continue to do so indefinitely. Hence, the nation cannot afford to have their physical utility impaired or their credit destroyed.

"Incidentally, it is well to point out that the United States is far more dependent upon railroads than any other country in the world. With less than 8 per cent. of the world's area and less than 7 per cent. of the world's population, our country owns one-third of the world's railway mileage and uses far more than a third of the total service, measured in ton miles and passenger miles annually.

"It is sometimes the custom to speak of highway and airway transport as competitive with the railroads. A sounder view, and one taken by the most advanced railroad managements, seems to be that, in so far as these forms of transportation are commercially used, they should be regarded as supplementary to railroad service. Ultimately we may come to think of transportation on the artificial inland waterways in the same light.

"The interstate commerce clause in the Constitution, empowering Congress to regulate commerce among the several states and the foreign nations, was written into that document in 1787. In that early day the only methods by which transportation was rendered between the states was by highways and waterways. Yet these are the only two forms of interstate transportation which are today entirely unregulated by Federal authority, while the railroads, which were probably not dreamed of by any of the signers of the Constitution, are the most highly and restrictively regulated. This is naturally an unfair and unjust condition and calls for remedy.

"It seems desirable that passenger bus transportation, though it has not been the chief cause of the loss of passenger revenues to the railroads—that, as stated, being principally attributable to the private automobile—should, nevertheless, be justly and properly regulated. Such regulation should not be for the purpose of destroying bus transportation or of artificially forcing back traffic to the railroads.

"It should be constructive and fair in its purposes, but it should require that those bus lines which are common carriers (and this would include practically all bus service except for schools), should, like the railroads—rendering an amost identical form of service—be required to obtain certificates of public convenience and necessity for initiation or extension of their lines; make and file proper reports and accounts; file tariffs covering their charges, and adhere to them; charge only such fares as may be just and reasonable; refrain from all discriminatory practices and render safe, adequate and regular service.

"It may be recalled with regret that a bill to subject buses to reasonable regulation failed in the last Congress, mainly because its opponents insisted upon attaching to it the unsound restriction that railroads should be barred from any participation in bus operations. The only possible justification for this was the fear of monopoly. But is not fear of monopoly inconsistent with the idea of fair and just regulation, particularly when the powers of the government to exercise regulation over the railroads are ample to meet any condition which may arise?

"Turning to motor trucks, we have a much more difficult situation to face with respect to problems of regulation. Very little motor truck commercial service is of the common carrier kind. We have privately operated trucks, private carriers for hire, and contract trucks, besides the relatively few which are common carriers. Only the common carrier trucks are really capable of regulation of a kind parallel to that exercised over the railroads. If we try to regulate them as to their rates, practices, accounting, etc., we will force them to abandon the status of

Continued on Page 11)

COMING EVENTS

SEPTEMBER

1- 3—Cleveland, O. Hotel Statler, Society of Automotive Engineers, twentieth annual aeronautical meeting in conjunction with National Air races.
8-17—Utrecht, Holland. Utrecht Fair, bus and truck show.
16-17—Atlantic City, N. J. National Petroleum Association, annual meeting, Hotel Traymore.
20-26—Springfield, Mass. Eastern States Exposition.
21-25—Boston, Mass. American Welding Society, meeting.
28-29—Atlantic City, N. J. National Association of Motor Bus Operators, fifth annual meeting, Hotel Ambassador.
26-Oct. 2—Atlantic City, N. J. American Electric Railway Association, annual meeting.

OCTOBER

1-11—Paris, France. International Automobile Salon.
2- 3—Houston, Tex. American Institute of Mining and Metallurgical Engineers, petroleum division meeting.
12-16—Chicago, Ill. National Safety Council.
14-16—Pittsburgh, Pa. Society of Industrial Engineers, convention.
15-24—London, England. International Motor Exhibition, Olympia Hall.
22-28—Prague, Czecho-Slovakia. International Automobile Exposition.

MYERS OILING SYSTEM SPECIFIED FOR BUSES

Rahway, N. J., July 23.—The United Railways and Electric Company, Baltimore, Md., has recently ordered over fifty new buses, again specifying that the chassis bearings be equipped with the Myers magazine oiling system.

This system is saving 75 per cent. of the greasing expense, making steering easier, and greatly increasing the life of the chassis bearings, United Railways officials assert.

WISCONSIN AXLES
—known for trouble-free service; and for efficiency in converting engine power into performance.
WISCONSIN AXLE CO.
OSHKOSH WISCONSIN

WITTNER WILL HANDLE DE VAUX ON LONG ISLAND

New York, July 23.—Announcement is made of the appointment of the Wittner Motor Company of 108-02-16 Merrick Boulevard, Jamaica, L. I., as De Vaux distributors for the territory which embraces practically all of Long Island except a small portion of Nassau County.

This appointment adds another link in the rapidly growing chain of De Vaux dealers and distributors, which now stretches from coast to coast.

LONG ISLAND COMPANY ADMITTED TO N. S. P. A.

New York, July 23.—Standard Motor Products, Inc., of Long Island City, has just been admitted to membership in the N. S. P. A.

E. Fife, president of the company, states that this year, instead of having the annual salesmen's convention of the firm in New York, it will be held at Atlantic City, immediately preceding the N. S. P. A. convention or during the show.

NEW COMMERCIAL CAR SALES FOR JUNE DOWN 18%; TOTAL 27,500

(Coninued from Page 1)

June in the reporting states with those of the corresponding month of last year and with May, 1931:

	June 1931	June 1930	May 1931
Arkansas	65	164	190
Delaware	105	97	107
Florida	506	343	364
Idaho	211	215	179
Illinois	1,056	1,385	1,452
Indiana	507	768	980
Maryland	523	506	518
Minnesota	514	781	1,013
Missouri	1,077	905	847
Montana	139	153	159
North Dakota	169	196	263
Ohio	1,208	1,624	1,575
South Carolina	211	269	297
South Dakota	144	195	219
Utah	175	245	154
West Virginia	343	402	391
Wisconsin	782	1,094	900
Dist. of Col.	201	153	215
Totals	7,936	9,493	9,624

STATE HIGHWAY, COUNTY, CITY AND GOVERNMENT DEPARTMENTS are large users of

Brockway-Indiana Trucks

The reputation of Brockway-Indiana trucks for dependable performance, low cost per ton mile operation and long life, is borne out by the ever increasing number of users in public work. Many of these fleets have grown from one or more trucks to as high as two hundred trucks.

If interested in buying or selling motor trucks today it will pay you to investigate the BROCKWAY-INDIANA line.

BROCKWAY MOTOR TRUCK CORP.,
General Office
Cortland - - - - New York

Cumulative New Commercial Car Registration Statistics, June, 1931

Returns for today: Connecticut, Iowa, Michigan.

Figures in this table are from R. L. Polk & Co. of Detroit, with the exception of Illinois, which are supplied by the Robinson Advertising Service, Springfield, Ill., and New Jersey, which are furnished by the New Jersey Motor List Co., New Car Division, Trenton, N. J. Some of this data has been published previously, but it is given here complete for the convenience of our subscribers. Readers desiring county, city or town lists, or lists in any given section, may obtain these by addressing any of these three companies.

In this table, 28 states and the District of Columbia. Commercial car registrations do not include buses.

States	Autocar	Brockway-Indiana	Chevrolet	Diamond-T	Dodge	Federal	Ford	G. M. C.	International	La France-Republic	Mack	Reo	Sterling	Stewart	Studebaker	Whippet	White	Willys	Willys-Knight	Miscellaneous	Totals	States
Alabama			122		1		107	7	7								1				245	Alabama
Arkansas			33				27		4								1				65	Arkansas
California	10	1	479	9	102	14	1051	37	65	5	12	35	9	7	23		14	6		78	1957	California
Connecticut	6	1	136	4	25	15	208	11	32	1	9	16		1	11		3	7		14	500	Connecticut
Delaware	1		40				44		14		1	4						1			105	Delaware
Florida			160		7	7	304		14		1	6					5	1		1	506	Florida
Idaho			50		14		125	2	9		1	2					2	2		4	211	Idaho
Illinois	8	3	350	29	51	2	421	12	98		8	6	1	3	15			18		31	1056	Illinois
Indiana		6	175	2	24	2	183	21	47	2	7	4		4	8	1	1	10		10	507	Indiana
Iowa			265	2	31		220	6	78		1	17			14		2	13		2	651	Iowa
Maryland	14	6	162	8	20	2	190	11	50	1	7	15	2	1	9	1	9	1	1	13	523	Maryland
Michigan	3		300	11	43	9	657	27	69	8	3	23			8		6	5		12	1184	Michigan
Minnesota			190	8	18	2	183	4	62	1		12			6		5	17		6	514	Minnesota
Missouri	1	4	423	3	44	6	421	37	64	1	3	9	5		6	5	5	10		30	1077	Missouri
Montana			44		4		67	1	18			1						1		3	139	Montana
Nebraska			128	1	15	3	130	4	41		4	4			4			8		5	347	Nebraska
New Hamp.	1	1	89	3	5	3	114	5	10		2	2	2	2	2			1			242	New Hamp.
Nor. Carolina			195	2	18		179	12	25	3	1	2			3		3	3		2	448	North Car.
North Dakota			45		5		44	1	57		1	7			5	1		2		1	169	North Dak.
Ohio	5	8	339	2	51	8	489	23	95	5	24	22	1	9	26		28	17	1	55	1208	Ohio
Rh. Island	3		51	2	18	3	98	14	12	2	4	4			2		1	3		5	222	Rhode Isl.
S. Carolina		1	104		9		86	2	4		2	1					2				211	S. Carolina
S. Dakota			52	1	5		43		30			2			5		1	4		1	144	S. Dakota
Utah			52		11		80	8	12		1	3			3		2	1		2	175	Utah
Virginia	3	4	263	3	16	4	313	4	31	2	3	3			2		3	3		4	661	Virginia
Washington			48		7		104	5	10		1	8	2		4		7			12	208	Washington
West Virginia		4	114	6	18		137	2	29	1	1	10	1		4		1	10		5	343	W. Virginia
Wisconsin			310	26	25	3	267	4	72		2	14	4	7	10	1	1	20		16	782	Wisconsin
Dist. of Col.	8		38	1	8		106	14	10		2	2	2				6	1		3	201	Dist. of Col.
Totals, 1931	63	39	4757	123	595	83	6398	274	1069	32	101	234	29	34	170	9	109	165	2	315	14601	Totals
Ala., 1930			121		5		195	5	3	2					2		11				344	Ala., 1930
Ark., 1930			81		1		70		9								3				164	Ark., 1930
Calif., 1930	7		554	7	96	14	1243	94	59	14	22	59	20	7	8	1	53	4	4	128	2394	Calif., 1930
Conn., 1930	12	10	137	6	40	3	183	21	18		28	28	1	12	7		5	2		22	535	Conn., 1930
Delaware, '30		1	33		1		50	2	3		3	2		1						1	97	Delaware, '30
Florida, 1930		2	95		4		218	3	8		3	6					2			2	343	Florida, 1930
Idaho, 1930			81		5		97	2	20		1	2					2			5	215	Idaho, 1930
Illinois, 1930	1		442	58	45	4	590	28	110		9	18	2	1		6	8	5	2	56	1385	Illinois, 1930
Indiana, 1930		61	200	2	24	1	341	38	56			9		5	1	6	1	5		16	766	Indiana, '30
Iowa, 1930		3	299	2	33	4	356	18	100		8	21			2	2	1	15	2	11	877	Iowa, 1930
Maryland, '30	8	14	112	5	12	3	237	17	30	1	27	5		3	1	1	18	5		7	506	Md., 1930
Mich., 1930	1	4	288	14	27	6	896	49	57	9	4	14	2	3		3	3	9		23	1412	Mich., 1930
Minn., 1930		3	238	23	22	2	376	7	69	1	2	7			1	3	2	13		12	781	Minn., 1930
Missouri, '30	4	5	306	12	25	2	429	26	33	2	10	5		2	2	4	13	6	1	18	905	Mo., 1930
Montana, '30			45		4		78	4	16			1			1	1	1			2	153	Mont.
Nebraska		9	179		9		233	10	39		3	1			1	2	5	5	2	7	505	Neb.
New Hamp.		5	84	12	9	1	138	2	1		2	9	1	2				2		1	269	N. [illegible]
Nor. Car., '30			203	1	8		209	5	13			2					1	3		1	446	N. C.
Nor. Dak., '30			58		7		85	3	32			3			1	2		1	1	3	196	N. D.
Ohio, 1930	26	9	346	2	59	12	780	67	92		16	40		18	4	17	40	12	2	82	1624	Ohio, 1930
Rho. Isl., '30	6	4	39		5		74	13	9			8	3		3		1	1		6	172	R. Island, '30
S. Car., 1930			90		2		163	1	4		2	1								6	269	S. Car., 1930
S. Dakota, '30			57	1	4	2	60		45			8		1	2		1	8		6	195	S. D., 1930
Utah, 1930			72		10		136	5	9		2	2					1			8	245	Utah, 1930
Virginia, '30	1	2	296	1	18	3	322	13	33	3	5	2		2			13	5	3	5	727	Va., 1930
Wash., 1930			72		8		197	8	19			5	1				7			15	332	Wash., 1930
W. Va., 1930		3	112	2	14		189	20	39			5		1		2	5	3		7	402	W. Va., 1930
Wisconsin, '30		6	405	10	31	5	462	23	82		5	19	3	5	1	3	6	8		20	1094	Wis., 1930
D. of Col., '30	5	1	23	3	9		91	7	1		3	1	3				1			5	153	D. of C., '30
Totals, 1930	71	142	5068	161	537	62	8498	491	1009	32	155	283	36	63	37	53	204	112	17	475	17506	Totals

Production - - Engineering - - Factory -

Modern Chassis Frames

The following, in part, is an article which appeared in a recent issue of the English publication, The Motor. It discusses riding comfort, road holding, and the durability of the car as affected by frame design. The illustrations, for the most part, are typical of foreign construction.

"During the greater part of the life of the car the chassis frame is out of sight and out of mind. Few people, therefore realize the importance of the passive part which it plays in the performance and durability of the vehicle. Nevertheless, it is no exaggeration to state that innumerable faults, ranging from body rattles to front wheel wobble, are actually traceable in many instances to shortcomings of the frame.

"This important component is nearly always constructed from a pair of long side members, of channel section, connected at intervals by cross members; all these parts are made of steel. In very expensive chassis carefully fitted bolts are employed to connect the components, but in most everyday cars riveting is adopted. In either case, the object is to provide a light and yet rigid structure which will carry the normal vertical load of the mechanism, coachwork and passengers without undue deflection.

"Were this the only form of loading the design of the frame would be simple enough. Unfortunately, front wheels tend to move up and down alternately, see-sawing the front axle. This is accompanied by wheel wobble and snatching at the steering wheel. It has been clearly proved that other things being equal, high speed wobble and unsteady steering are much less liable to occur if the front end of the frame is adequately stiffened against twisting.

"This is one of the main reasons for the general return to a rigid four-point engine mounting which has occurred during the past few years. By using a stout cross-member at the front end of the crankcase and another in line with the clutch housing, both braced by the engine itself, a very stiff rectangular structure is obtained for the front of the frame, which may be further reinforced by a stout tube connecting the front dumb irons.

"The central cross-member, just behind the transmission often takes the form of a stout tube, the better to resist torsion. Various forms of pressed steel channeling are also widely used, good examples being the cruciform designs employed by Delage and Talbot. Behind this important member are usually placed two cross tubes or channels connecting the side members at points in line with the front and rear connections of the rear springs; the former of these cross-members is often arranged to pass under the propeller shaft. In order to reduce the amount of downward cranking which it requires to clear the shaft, it is usually bolted to the under side of the frame channels.

"A third kind of stressing which a frame receives is one which is caused by a wheel hitting an obstruction. Viewing the chassis in plan, Fig. 1, it is clearly shown that a blow of this kind will be transmitted through the axle and spring and will tend to move one side member rearwards in relation to the other. This action is sometimes called 'lozenging', as it tends to alter the shape of the frame from a rectangle to that of a lozenge. Mainly for this reason, the connections at the ends of the cross members are often reinforced by triangular plates called gussets.

"Modern frames are a very different shape than those employed a few years ago. Viewed from the

(Continued on Page 7)

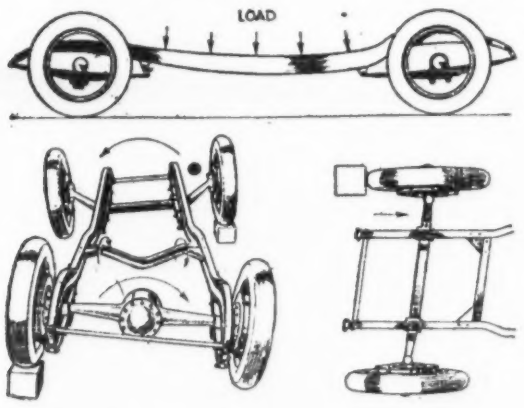


FIG. 1. Three ways in which a frame is stressed—bending, due to direct loading; twisting on uneven surfaces and "lozenging," due to blows imparted to the wheels

so soon as a car is driven on the road a number of causes combine to place loads of a different kind upon the framework. The most serious is undoubtedly the twisting or racking effect which occurs on a rough road, when diagonally opposite wheels are raised or lowered, so placing the axles at an angle with one another. A flexible frame, subject to this kind of distortion, is very destructive to coachbuilt bodies.

"Fig. 1 shows clearly that this action tends to throw the side members out of line, stresses the connection at the end of every cross-member, and places a twisting load upon the cross-members themselves. The central member experiences the greatest twisting effect and is usually made of extremely strong section for this reason.

"A somewhat similar twisting effect is produced at high speeds if there is a tendency for wheel wobble, accompanied by wheel tramp, to occur. Under certain conditions, with under-inflated low-pressure tires, the

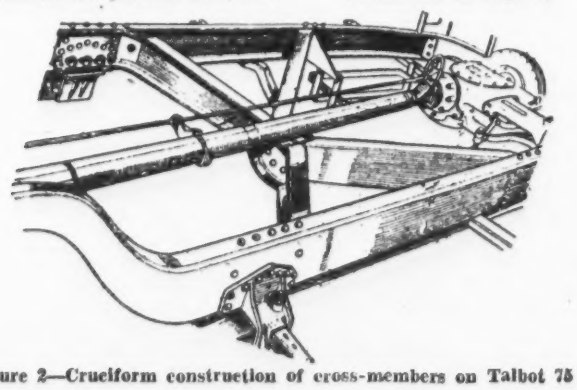


Figure 2—Cruciform construction of cross-members on Talbot 75

PETROLEUM CRACKING PLANT CAPACITIES IN 1930 INCREASE

The total daily charging capacity of the cracking plants, both completed and under construction, in this country amounted to 1,950,781 barrels as of January 1, 1931, according to a survey conducted by the petroleum economics division of the United States Bureau of Mines, Department of Commerce. The figures represented an increase over the previous year of 14 per cent.

The total daily capacity of the operating plants amounted to 1,594,990 barrels, or 82 per cent. of the grand total, the capacity of the inoperative plants was 244,661 barrels, or 12 per cent. of the total, while the capacity of the plants under construction amounted to 111,130 barrels, or 6 per cent., says G. R. Hopkins, economic analyst, in a report just made public by the Bureau of Mines. In comparison with a year ago, these data indicate a decline in the total capacity of the plants being built, but show material increases in the capacity of both the other two classes.

The total number of cracking units completed or under construction on January 1, 1931, totaled 1,868, as compared with 2,002 the previous year and with a high of 2,559 on June 1, 1926. During the period between June 1, 1926, and January 1, 1931, the total charging capacity of the cracking plants has more than doubled, but the number of units has shown a material decline. This condition has been brought about largely through the dismantling of many Burton stills of small capacity and through the tendency to increase the size of the new units.

The production of gasoline by means of the cracking process has shown a steady increase since such statistics were first compiled for 1925. In 1930 the production by this method amounted to 164,243,000 barrels, an increase over 1929 of 20,516,000 barrels, or 14 per cent. As the increase in total motor production in 1930 was only 0.5 per cent., the relative proportion of cracked gasoline rose from 33 per cent. in 1929 to 37.7 per cent. in 1930. In December, 1930, the ratio of cracked gasoline to the total reached 41.1 per cent., the first month that it had exceeded 40 per cent.

Thirty-five different types of cracking processes are listed in this survey, as compared with thirty-eight a year ago.

The development of pipe stills which can be used for either skimming or cracking indicates that the dividing line between these two refining methods will tend to disappear.

The year witnessed a further gain in importance of the vapor-phase method of cracking.

The growth in the utilization of refinery or still gases was continued throughout 1930. A number of refineries installed vapor-recovery systems to collect these gases, which had been going to waste. The major part of the gases recovered are treated in absorption plants, and the gasoline obtained has constituted an appreciable item in the motor-fuel supply. The residue gas is turned into pipe lines or is used for fuel under boilers and stills. A material factor in the increased supply of refinery gas has been a gain in the use of vapor-phase cracking processes which produce large quantities of such gas. The increase in vapor-phase cracking has been due primarily to an increased demand for anti-knock motor fuel, but it is probable that some installations have been influenced by the fact that there was a ready market for the gas.

A complete list of cracking plants, giving data as to the type, location, number of units and total daily charging capacity, is given in Information Circular 6509. Copies of this circular may be obtained from the United States Bureau of Mines, Department of Commerce, Washington, D. C.

Gasoline Service Station Illumination

By R. J. SWACKHAMER
Illuminating Engineering Laboratory, General Electric Company

The following, in part, is the second and concluding installment of an article which appears in the current issue of the General Electric Review, and is published through the courtesy of the General Electric Company. It outlines the latest practice in the exterior lighting of gasoline service stations. Suggestions are given for the proper method of installation, and included are data on this particular lighting problem.

The average station has approximately three points where poles for supporting projectors can be located conveniently and from which good illumination distribution will result, Fig. 1. Likewise, the average number of 1,000-watt projectors usually found at single stations is four. These projectors are supported on poles in the manner indicated in Fig. 2, each pole mounting one or two projectors, depending upon the requirements of the location.

Ornamental Floodlighting Luminaires—To meet a demand for lighting equipment of a more decorative or ornamental character, the ornamental floodlighting luminaires were developed. These consist of an ornamental street lighting unit into which has been arranged a redirecting reflector which is adjustable and which provides the floodlighting characteristic of the combination, as shown in Fig. 3. They are usually provided with a small auxiliary lamp which maintains the symmetry in appearance of the globe, which might otherwise be destroyed by a shadow from the reflector.

Such units are for the larger and more elaborate stations. They are used singly or sometimes two to a standard and in most cases the number of standards range from three to six. The standards usually chosen are ornamental in character and in keeping with the unit. Their mounting heights vary from 15 to 18 feet for single units and 16 to 22 feet for two or more units.

The 1,000-watt general service Mazda lamp is usually used for the major light source, while a 200-watt lamp of the same type serves as the auxiliary.

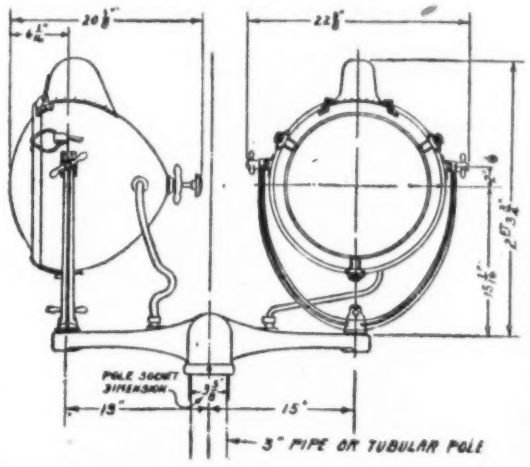


FIG. 2. Pole arm for mounting projectors

Data on Projector With 500-Watt General Service Lamp Operated at 9,800 Lumens. Projector Equipped With Narrow-Angle Glass Reflector and Wide-Angle One-Piece Sectional Reflector.

Lens.	Beam Divergence	Beam Candles	Beam Lumens	Total Lumens
With Narrow-Angle Reflector—				
Plain	20.6 deg. V.* by 26.6 deg. H.†	110,000	4300	7050
Lightly stippled	40.2 deg. V. by 35 deg. H.	43,600	4290	6960
Heavily stippled	64 deg.	16,500	4810	6680
40 deg. spread	20 deg. V. by 53 deg. H.	34,200	4225	6760
With Wide-Angle One-Piece Sectional Reflector—				
Plain	44 deg.	28,000	4250	6080
Lightly stippled	54 deg.	19,000	4400	5970
Heavily stippled	88 deg.	8,600	4870	5820

Data on Projector With 1,000-Watt General Service Lamp Operated at 20,000 Lumens. Projector Equipped With Wide-Angle Composite Glass Reflector and Wide-Angle Facet-Type Reflector.

Lens.	Beam Divergence	Beam Candles	Beam Lumens	Total Lumens
With Wide-Angle Composite Reflector—				
Plain	21 deg. V.* by 27 deg. H.†	142,000	7558	13,650
Lightly stippled	31 deg. V. by 37 deg. H.	78,600	7900	13,550
Heavily stippled	67 deg.	30,000	9700	13,420
40 deg. spread	21 deg. V. by 53 deg. H.	70,000	8458	13,560
With Wide-Angle Facet-Type Reflector—				
Lightly stippled	115 deg.	13,750	13,800	15,040

*V—Vertical. †H—Horizontal.

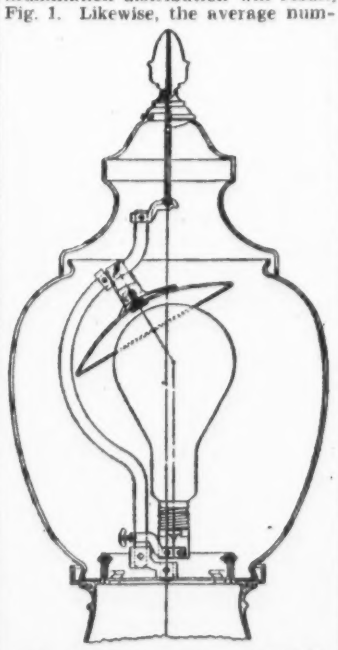


FIG. 3. Ornamental floodlight luminaire with universal adjustment

Data on Combination Floodlighting and Street-Lighting Ornamental Luminaries.

Type	Globe (1)	Canopy (2)	Lamp Main in Watts	Lamp Auxiliary in Watts
Luminaire Form 8.	123	1123	500	150
*Luminaire Form 9.	118	1118	1000	200
Luminaire Form 12	124	1124	1000	200
	118	1118	1000	200
Lantern Luminaire	Granite opalescent glass panels		1000	200

*See Fig. 3. (1) and (2)—Numbers denoting design.

Open Floodlights — The open

(Continued on Page 7)

Equipment - - - Development

Chassis Frames

(Continued from Page 6)

side, the channels have been altered in order to bring them closer to the road, and the general shape in plan has also changed considerably for reasons connected with stability and the design of body-work.

"In Fig. 4, three stages in the development of the side member are shown. In the first, this member is practically straight, the necessary axle clearance being obtained by using heavily cambered springs with a three-quarter elliptic design

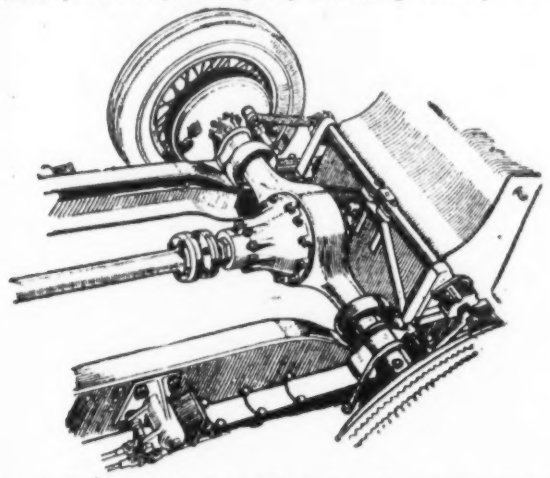


Figure 3—Invicta model in which frame passes below the axle

of the back. In the next stage the side member becomes upswept at the back to give clearance for the axle and the springs are of much flatter design, so that the general level is very much lower than in the previous case. The third design, which is becoming very popular, is known as the 'double-drop' frame, because the side members are kicked upwards over both the front and rear axles. The springs are practically flat under normal loading, and are underslung at the back.

"A point not generally realized, which may be mentioned in passing, is that the side members which carry the vertical load are actually supported at the ends of the springs; the consequently bending action which they suffer therefore increases very rapidly if the wheelbase be lengthened. The deflection of a beam under a certain load actually increases in proportion to the cube of the distance between the supports, so that if this distance be doubled, the deflection becomes eight times as great. When the wheelbase is very lengthy, as in a powerful car designed for seven-seater coach work, bracing rods are sometimes provided under the side-members to reinforce them against bending.

"In plan view the side members of early types of frame were practically parallel throughout their length. The next step consisted of bending them outwards just behind the engine so as to provide a wider platform for the body; this change also enabled the rear springs to be brought closer to the wheels, thereby increasing stability. It should scarcely be necessary to point out that it is impossible to increase the frame width at the front because of the clearance which is necessary for the front wheels when steering.

"The third stage, which is featured in several important cars introduced recently, consists of shaping the side members to conform with the floor plan of the body. This is done in order to permit the direct connection of a pressed-steel saloon to the channel side-members. Under these conditions the body and frame reinforce one another, forming what amounts to a single structure of great strength.

"As regards future developments, several interesting possibilities are exemplified by certain unorthodox cars which have already been produced. Perhaps the most interesting of these is the tubular backbone which is employed by the Austro-Daimler and Tatra concerns in combination with an articulated rear axle. The body is carried by bearers secured to the tube and is therefore entirely free from the effects of frame distortion. In the Tatra design the engine structure itself is used to carry the front springing and axle.

"Another novel scheme is to use a single casting of light alloy for the frame, fuel tank, parts of the engine and the floor of the body; this has been done by M. de Lavaud and certain other experimenters. The disadvantages would appear to be the cost of these alloys and the expense of repairs should the car be damaged in collision.

"Apart from developments of this kind, the design of the frame would no doubt be greatly changed should other mechanical innovations make headway, such as a rear location for the engine, individual wheel springing or front-wheel driving."

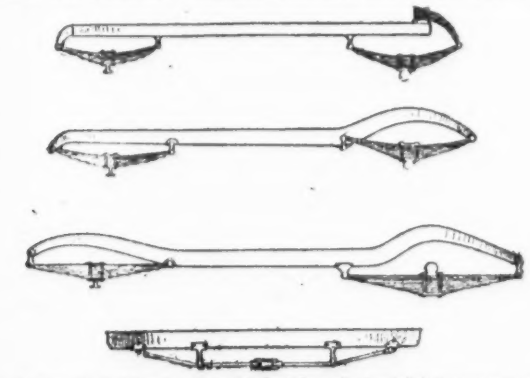


Figure 4 (top to bottom)—An old-fashioned straight frame; a popular contemparary type; double drop frame with flat springs

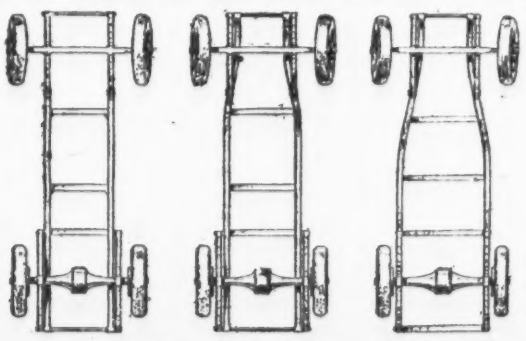


Figure 5—Three stages of frame development

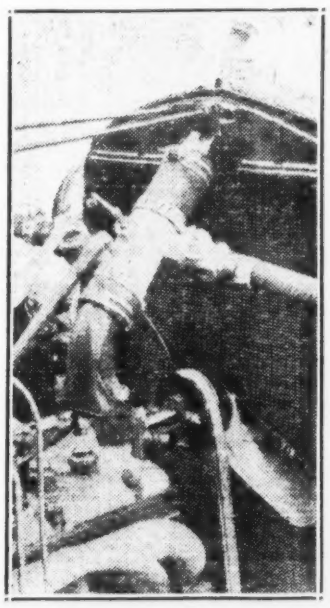
ENGINEERING SOCIETY WARNS MEMBERS OF EMPLOYMENT RACKET

In warning its members against the employment racketeer, the American Society of Mechanical Engineers relates the experience of one of its members who recently received a mimeographed letter in reply to a newspaper advertisement.

The letter stated that, to eliminate those not fitted for the position and to form an engineering staff of very best material, applicants would be furnished with drawing materials and problems which must be solved and submitted for consideration. Engineers submitting the best solutions, most orderly drawings, etc., would be hired. For this "courtesy" the applicant was requested to pay $5.

Members seeking employment should use particular care when a fee is required and should make certain that the concern is a reputable company. The Engineering Societies Employment Service is trying to place unemployed members and advantage should be taken of this service where possible.

SOLVO FLUSHING DEVICE FOR FORDS



SOLVO flushing device installed on Ford Model A

A new flushing device for Ford cooling systems is announced by Solvo Laboratories, Inc., Milford, Conn. The device permits the reversal of the hot solution used for removing rust and sediment.

A. S. M. E. TO HOLD 1932 MEETING AT LAKE OF BAYS

The Ontario section of the society has started on plans for the semi-annual meeting of the American Society of Mechanical Engineers, to be held at Bigwin Inn, Lake of Bays, Ontario, Canada. Committees have been appointed under the chairmanship of S. L. Fear, chairman of the executive committee of the Ontario section.

Illumination of Gasoline Service Stations

(Continued from Page 6)

floodlight serves the locations and stations where the lighting requirements are almost the reverse of those outlined for the combination luminaires. It offers a ready means of installing comparatively high wattage at low cost. These floodlights should be used only at stations remotely situated or to serve special purposes at more prominent locations.

In the past the chief objection, beside the appearance of open type floodlights, has been their rapid and tremendous depreciation. In most types after short periods of operation it becomes necessary to repaint or refinish the reflecting surfaces. This objection has been overcome by the development of units with a matt surface fire enamel. Such a surface maintains its reflecting efficiency throughout the life of the unit, provided it is kept clean, and this can be easily accomplished by means of soap and water.

The appearance of most open type floodlights compares unfavorably with the other types of lighting equipment; and for this reason care should be exercised in their use. They should only be employed at locations where appearance is of secondary importance.

Signs and Greasing Pits—The floodlight illustrated in Fig. 4 presents a ready means of illuminating greasing pits and signs. Two of these units are required for the average pit, and they are usually located one at each end, and in such a position that they are not subjected to the hazard of becoming damaged or dirty. The fact that these floodlights possess the property of projecting light to a distance which permits a permanent installation, in the manner described, insures that they will operate at good efficiency over a long period of time. The units are designed for indoor and outdoor service, and accommodate a 100-watt lamp. They are constructed for universal adjustment, and are made throughout of non-corroding material.

FIG. 4. 100-watt utility floodlight

Lamps and Cable—When the distribution equirements for a particular station have been satisfied, the largest capacity lamp that can be used in the projector or that will provide the intensity required can be used with best economy. The larger capacity lamps are made with better efficiency than in the smaller sizes.

Careful consideration should be given to the selection of lamps of proper voltage. A variation in voltage of one per cent. means as much as 3 and 4 per cent. loss in lumen output. The voltage at the lamp-holder should be determined so that lamps of proper voltage may be used.

Adequate wiring should be installed in all cases so that excessive voltage drops will be eliminated. A drop of five volts on a 115-volt circuit between the panel and the lighting outlet will result in a loss of approximately 18 per cent. in light generated by a 115-volt lamp.

Very often, lamps operate beyond their normal rated life and become blackened. The continued use of lamps such as these is very uneconomical, and it is thus essential that they be promptly replaced.

Economy will be effected by anticipating changes or future requirements at the time the initial installation is made. In every instance, it will be advisable to install the next larger size of cable than is required for existing demands.

Figue 5 shows a good example of gas station lighting.

SNAP SHOTS

George W. Codrington, president of the Winton Engine Company, was elected president of the Diesel Engine Manufacturers' Association at a recent meeting of the organization. At the same meeting the association voted to give a $100 prize for the best paper submittted to the National Oil and Gas Power meeting at Madison, Wis., June 23-26.

* * *

W. T. Donkin, metallurgist for the Cleveland Wire Spring Company, has been elected chairman of the Cleveland Chapter of the American Society for Steel Treating.

* * *

George B. Karelitz has been appointed acting manager of the mechanics division of the Westinghouse Research Laboratories, East Pittsburgh, Pa. Mr. Karelitz joined the Westinghouse company in 1923 and served as a research engineer until September, 1930, when he joined the engineering faculty at Columbia University, New York.

* * *

Vincent E. McMullen, works manager of the Indianapolis plant of Fairbanks, Morse & Co., was elected president of the Indianapolis branch, National Metal Trades Association, at its twenty-fifth annual dinner.

* * *

Dr. Florus R. Baxter, chief of the testing laboratories of the Vacuum Oil Company, recently completed fifty years of service with that company.

FIG. 5. Night view of gasoline service station lighted with four 1,000-watt floodlighting projectors

Major Specifications and Mechanical Details of 1931 Commercial Cars

Make and Model	Capacity—Tons or Lbs.	Chassis Price	Engine	Valve Arr'g'm't	No. of Cyls.	Bore and Stroke	Piston Disp.	Tax H. P.	Max. Brake H. P. and Peak R. P. M.	Type Camshaft Drive	Radiator Make	Clutch Make	Universals Make	Steering Gear Make	Carburetor Make	Fuel Feed Type	Make Electr'l System	Make Transmission	No. Spds. For.	Rear Axle Make	Type Final Drive	Final Gear Reduction	Type Service Brakes	Area Service Brakes	Standard Wheel Base	Chassis Wgt.	Standard Tire Sizes Front	Rear
*Am La France Chief	2½	3650	Own	L	6	3¾x5	331.0	33.7	65@2100	G	G & O	Borg	Spic	Ross	Str	Vac	DR	Own	4	Tim	Wo	31.2	B4IMV	—	156	6200	32x6	32x6D
*Am. La France Chieftain	3-4	6725	Own	L	6	4½x6	411.0	40.8	85@1800	G	G & O	Borg	Spic	Ross	Zen	Vac	DR	Own	4	Tim	Wo	28.8	B4IMV	—	175	7200	36x8S	36x8D
Am. La France Big Chief	6	5800	Own	L	6	4½x5½	572	48.6	115@1600	—	—	—	—	Ross	Zen	Vac	DR	Own	4	Own	2 R	32.8	W41A	—	226	10600	40x8S	40x8SD
Aust o	400	475	Own	L	4	2.2x3	45.6	7.8	13@3000	G	Hex	Rock	Spic	Own	Til	Gra	Aut	W-G	3	Sal	Sp	5.25	O4M	76.5	75	1210	3.75x18	3.75x18
Autocar A	1½-2	3200	Own	L	6	4 x4¾	358.0	38.4	82@2400	G	Per	Long	Spic	Ross	Str	Vac	DR	Brl-L	4	Own	Sp	27.9	LO4ID	460	150	5060	34x7	34x7
Autocar D	2-2½	3500	Own	L	6	4 x4¾	358.0	38.4	82@2400	G	Per	Long	Spic	Ross	Str	Vac	DR	Brl-L	4	Own	2 R	33.5	LO4ID	460	150	5300	34x7	34x7D
†Autocar SH	2½-3	4300	Own	L	6	4¼x4¾	404.0	43.4	92@2400	G	Own	Long	Spic	Ross	Str	Gra	DR	Own	4	Own	2 R	44.0	O2IM	328	114	6770	34x7	34x7D
†Autocar SCH	2½-3	4300	Own	L	6	4¼x4¾	404.0	43.4	92@2400	G	Own	Long	Spic	Ross	Str	Vac	DR	Own	4	Own	2 R	44.0	O2IM	328	157	6860	34x7	34x7D
†Autocar H	3	4100	Own	L	4	4½x5½	350.0	32.4	45@1450	G	Own	Long	Spic	Ross	Str	Gra	DR	Own	4	Own	2 R	48.6	O2IM	328	114	6770	34x7	34x7D
†Autocar HS	3½	4600	Own	L	4	4½x5½	350.0	32.4	45@1450	G	Own	Long	Spic	Ross	Str	Gra	DR	Own	4	Own	2 R	54.3	O2IM	516	114	7900	40x8	40x8D
†Autocar SHS	3-3½	4800	Own	L	6	4¼x4¾	404.0	43.4	92@2400	G	Own	Long	Spic	Ross	Str	Gra	DR	Own	4	Own	2 R	54.3	O2IM	516	114	7900	40x8	40x8D
Autocar SCHS	3-3½	4800	Own	L	6	4¼x4¾	404.0	43.4	92@2400	G	Own	Long	Spic	Ross	Str	Vac	DR	Own	4	Own	2 R	54.3	O2IM	516	157	8180	40x8	40x8D
Autocar N	3-3½	4600	Own	L	6	4¼x4¾	404.0	43.4	92@2400	G	Own	Long	Spic	Ross	Str	Vac	DR	Own	4	Own	2 R	41.2	OL4IH	574	174	7990	36x8	36x8D
Autocar TEA	3-3½	5350	Own	L	6	4¼x4¾	404.0	43.4	92@2400	G	Own	Long	Spic	Ross	Str	Vac	DR	Own	12	Own	2 R	101.1	LO4ID	602	192	8900	36x8	36x8D
Autocar TFA	3½-5	6100	Own	L	6	4½x4¾	453.0	48.6	101@2400	G	Own	Long	Spic	Ross	Str	Vac	DR	Own	12	Own	2 R	101.3	LO4ID	602	192	9300	38x9	38x9D
Autocar C	3½-5	5500	Own	L	6	4½x4¾	453.0	48.6	101@2400	G	Own	Long	Spic	Ross	Str	Vac	DR	Own	4	Own	2 R	51.7	O2IM	516	172	9500	42x9	42x9D
Autocar CE	7½	6000	Own	L	6	4½x4¾	453.0	48.6	101@2400	G	Own	Long	Spic	Ross	Str	Vac	DR	Own	4	Own	2R	51.7	LO41V	670	172	19500	36x7S	40x8SD
Autocar F	7½	6800	Own	L	6	4½x4¾	453.0	48.6	101@2400	G	Own	Br-L	Spic	Ross	Str	Vac	DR	Brl-L	7	Tim	Wo	94.0	LT4DV	674	173	11000	36x7S	40x8SD
*Autocar G	10	9000	Own	L	6	4½x4¾	453.0	48.6	101@2400	G	Own	Br-L	Spic	Ross	Str	Vac	DR	Brl-L	7	Tim	Wo	100.0	T6IA	720	171	13000	36x8	36x8D
Brockway 60	*6000	995	Con	L	6	3¾x4	214.7	27.3	61@3000	C	G & O	Borg	Spic	Ross	Zen	P	Aut	W-G	3	Col	Sp	19.8	B4IM	297	132	*3200	30x5	30x5
Brockway 65	6500	1195	Con	L	6	3¾x4⅝	248.2	27.3	65@2700	C	G & O	Borg	Spic	Ross	Zen	Vac	Aut	Brl-L	3	Col	Sp	21.3	C4IM	244	137	3400	30x5	30x5
Brockway 75	7500	1393	Con	L	6	3¾x4⅝	248.2	27.3	65@2700	C	G & O	Borg	Spic	Ross	Zen	Vac	Aut	Brl-L	4	Col	Sp	25.6	C4IM	244	137	3450	32x6	32x6
Brockway 90	9000	1525	Con	L	6	3¾x4⅝	248.2	27.3	65@2700	C	G & O	Borg	Spic	Ross	Zen	Vac	Aut	Brl-L	4	Col	Sp	29.9	C4IM	292	149	4050	32x6	32x6
Brockway 120	12000	1990	Con	H	6	4 x4⅝	311.0	38.4	73@2400	C	G & O	Br-L	Spic	Ross	Zen	P	Aut	Brl-L	4	Tim	Sp	31.3	L4IH	353	156	5200	32x6	32x6D
Brockway 130	14000	2495	Con	H	6	4 x4⅝	311.0	38.4	73@2400	C	G & O	Br-L	Spic	Ross	Zen	P	Aut	Brl-L	4	Wis	2 R	35.3	L4IHV	356	156	5590	32x6	32x6D
Brockway 140	17000	2935	Con	H	6	4 x4⅝	311.0	38.4	73@2400	C	G & G	Br-L	Spic	Ross	Zen	P	Aut	Brl-L	4	Wis	2 R	46 2	L4IHV	356	170	6200	32x6	32x6D
Brockway 151	17000	3160	Con	H	6	4½x4¾	380.9	40.8	89@2400	C	G & O	Br-L	Spic	Ross	Zen	P	Aut	Brl-L	4	Wis	2 R	46.6	L4IHV	380	170	6890	32x6	32x6D
Brockway 170	17500	3660	Con	H	6	4¾x4¾	427.5	45.9	100@2400	C	G & O	—	Spic	Ross	Zen	P	Aut	—	5	Wis	2 R	45.3	L4IHV	380	170	7200	34x7	34x7D
Brockway 175	19500	3820	Con	H	6	4¼x4¾	380.9	40.8	89@2400	C	G & O	Br-L	Spic	Ross	Zen	P	Aut	Brl-L	4	Wis	2 R	49.5	L4IHV	471	170	7500	34x7	34x7D
Brockway 190	19000	4185	Con	H	6	4¼x4¾	380.9	40.8	89@2400	C	Long	Borg	Spic	Ross	Zen	P	Aut	Brl-L	7	Tim	Wo	78.6	T2IMV	471	168½	7625	34x7	34x7D
Brockway 220	22000	4560	Con	H	6	4¾x4¾	427.5	45.9	100@2400	C	G & O	Br-L	Spic	Ross	Zen	P	Aut	Brl-L	4	Wis	2 R	50.7	L4IHV	546	170	8200	36x8	36x8D
Brockway 250	25000	5350	Con	H	6	4¾x4¾	427.5	45.9	100@2400	C	Long	Br-L	Spic	Ross	Zen	P	Aut	Brl-L	4	Tim	Wo	63.7	LT4IVA	864	182	10000	40x8	40x8D
Brockway 290	30000	7250	Con	L	6	4¾x5¾	611.4	54.1	116@1800	C	Long	Br-L	Spic	Ross	Str	P	L-N	Brl-L	7	Tim	Wo	95.0	T4IA	676	182	10750	38x7P	40x14S
*Brockway 640	40000	9700	Con	L	6	4¾x5¾	611.4	54.1	116@1800	C	Long	Br-L	Spic	Ross	Str	P	L-N	Brl-L	7	Tim	Wo	99.9	T4IA	864	212	14000	38x7P	38x10S
Chevrolet	½	355	Own	H	6	3⅛x3¾	194.0	26.3	50@2600	G	Har	Own	Own	Own	Car	P	DR	Own	3	Own	Sp	13.6	O4IM	101	109	*1830	19x4.75	19x4.75
Chevrolet	1½	590	Own	H	6	3⅛x3¾	194.0	26.3	50@2600	G	Har	Own	Own	Own	Car	P	DR	Own	4	Own	Sp	33.4	O4IM	170	157	3015	30x5	30x5D
Chevrolet	1½	520	Own	H	6	3⅛x3¾	194.0	26.3	50@2600	G	Har	Own	Own	Own	Car	P	DR	Own	4	Own	Sp	33.4	——	—	131	2790	30x5	32x6
Commerce Series S 11	1	1600	Bud	L	6	3⅜x4½	241.6	27.3	53@2200	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Brl-L	4	Col	Sp	25.5	L4IH	297	142	3900	30x5P	30x5P
Commerce Series S 11	1½	1900	Bud	L	6	3⅜x4½	241.6	27.3	53@2200	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Brl-L	4	Tim	Sp	29.2	L4IH	297	162	4300	30x5P	30x5DP
Commerce Series S 11	1½	2990	Bud	L	6	3⅜x5	309.6	31.5	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Brl-L	4	Tim	Wo	34.8	L4IH	394	168	4700	34x5P	34x5DP
Commerce Series S 11	2	2030	Bud	L	6	3⅜x4½	241.6	27.3	53@2200	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Brl-L	4	Tim	Sp	29.2	L4IH	297	162	4500	32x6P	32x6D
Commerce Series 40	2	3240	Bud	L	6	3⅜x5	309.6	31.5	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Brl-L	4	Tim	Wo	34.8	L4IH	394	168	4900	32x6	36x6D
Commerce Series 40	2½	3240	Bud	L	6	3⅜x5	309.6	31.5	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Brl-L	4	Tim	Wo	34.8	L4IH	394	168	5100	36x6P	36x6D
Commerce Series 60	2½	4580	Bud	L	6	4¼x5⅛	410.9	40.8	83@2100	G	Long	Ful	Blo	Han	Zen	Vac	Aut	Ful	5	Tim	Wo	63.0	L4IH	584	175	7000	36x6P	36x6D
Commerce Series 60	3	4680	Bud	L	6	4¼x5⅛	410.9	40.8	83@2100	G	Long	Ful	Blo	Han	Zen	Vac	Aut	Ful	5	Tim	Wo	63.0	L4IH	584	175	7100	36x6P	38x7D
Commerce Series 80	3½	5250	Bud	L	6	4¼x5¼	411.0	40.8	83@2100	G	Long	Own	Blo	Ross	Zen	Vac	Aut	Brl-L	7	Tim	Wo	98.2	——	—	175	8200	36x6S	36x6S
Commerce Series 80	4	5330	Bud	L	6	4¼x5¼	411.0	40.8	83@2100	G	Long	Own	Blo	Ross	Zen	Vac	Aut	Brl-L	7	Tim	Wo	98.2	——	—	175	8400	36x6S	38x14S
Commerce Series 100	5	5830	Bud	L	6	4½x5¼	411.0	40.8	83@2100	G	Long	Own	Blo	Ross	Zen	Vac	Aut	Brl-L	7	Tim	Wo	95.0	——	—	175	9600	36x6S	40x14S
Day Elder 60	1	1095	Con	L	6	3⅜x4	214.7	27.3	61@3000	C	G & O	Borg	Spic	Ross	Zen	P	DR	W-G	4	Tim	Sp	38.3	B4IM	241	135	*3200	20x6.00B	20x6.50B
Day Elder 85	1½	1645	Con	L	6	3⅜x4⅝	248.3	27.3	65@2700	C	Per	Borg	Spic	Ross	Zen	P	DR	W-G	4	Tim	Sp	42.3	L4IH	229	135	3750	20x6.00B	20x6.50DB
Day Elder 110	2	2095	Con	L	6	3⅜x4⅝	248.3	27.3	65@2700	C	Per	Br-L	Spic	Ross	Zen	P	DR	Br-L	4	Tim	Sp	44.9	L4IH	306	156	4600	20x7.00B	20x7.00DB
Day Elder 130	2½	2895	Con	H	6	4 x4½	311.0	38.4	73@2400	C	Per	Br-L	Spic	Ross	Zen	P	DR	Br-L	4	Tim	Sp	40.7	L4IH	354	157	6400	20x7.50B	20x7.50DB
Day Elder 160	3	3695	Con	H	6	4 x4½	339.3	38.4	82@2400	C	Per	Br-L	Spic	Ross	Zen	P	DR	Br-L	4	Tim	Wo	36.1	L4IH	398	156	6600	20x7.50B	20x9.00DB
Day Elder 200	4	4295	Con	H	6	4 x4½	339.3	38.4	82@2400	C	Per	Br-L	Spic	Ross	Zen	P	DR	Br-L	4	Tim	Wo	43.5	L4IHV	489	158	7400	20x9.00B	20x9.00B
Day Elder 240	5	5500	Con	H	6	4¾x4¾	427.5	45.9	100@2600	C	Per	Br-L	Blo	Ross	Zen	Vac	DR	Br-L	4	Tim	Wo	50.8	L4IHV	520	162	9300	38x9P	38x9DP
Day Elder 285	8	6000	Con	H	6	4¾x4¾	427.5	45.9	100@2600	C	Per	Br-L	Blo	Ross	Zen	Vac	DR	Br-L	7	Tim	Wo	71.2	L6IHV	674	164	12000	20x8.25B	20x8.25DB
*Day Elder 285	10	7500	Con	H	6	4¾x4¾	427.5	45.9	100@2600	C	Per	Br-L	Blo	Ross	Zen	Vac	DR	Br-L	7	Tim	Wo	79.9	W61A	400	164	12500	20x9.00B	20x9.00DB
*Day Elder 345	12	9000	Con	L	6	4¾x5¾	611.4	54.2	127@2300	G	Per	Br-L	Blo	Ross	Zen	P	DR	Br-L	7	Tim	Wo	84.6	W61A	490	164	14000	20x9.75B	20x9.75DB
Diamond T 246	1½	695	Her	L	6	3⅜x4½	228.0	27.3	56@2400	G	G & O	Borg	Spic	Ross	Zen	P	Aut	W-G	4	Cla	Sp	——	L4IH	252	135½	3130	20x6.50B	20x6.50B
Diamond T 291	1½-2	1325	Her	L	6	3½x4½	268.0	29.4	60@2400	G	G & O	Borg	Spic	Ross	Zen	P	Aut	Cov	4	Cla	Sp	——	L4IH	279	156½	4500	20x6.50B	20x6.50DB
Diamond T 303	2-2½	1585	Her	L	6	3¾x4½	298.0	33.7	67@2400	G	G & O	Borg	Spic	Ross	Zen	P	Aut	Cov	4	Cla	Sp	——	L4IHV	350	159¾	5000	20x7.00B	20x7.00DB
Diamond T 551	2½-3	2050	Her	L	6	4 x4½	339.0	38.4	74@2400	G	G & O	Cov	Spic	Ross	Zen	P	Aut	Cov	4	Tim	Sp	——	L4IHV	408	168	5600	20x7.50B	20x7.50DB
Diamond T 594	3	2375	Her	L	6	4 x4½	339.0	38.4	74@2400	G	G & O	Cov	Spic	Ross	Zen	P	Aut	Cov	4	Wis	2 R	——	L4IHV	408	176½	6400	20x8.25B	20x8.25DB
Diamond T 596	3	2675	Her	L	6	4¼x4½	383.0	43.3	85@2200	G	G & O	Cov	Spic	Ross	Zen	P	Aut	Cov	5	Wis	2 R	——	L4IHV	408	184	6400	20x8.25B	20x8.25DB
Diamond T 603	3-4	2975	Her	L	6	4¾x4¾	428.4	45.9	94@2200	G	G & O	Cov	Spic	Ross	Zen	P	Aut	Cov	5	Wis	2 R	——	L4IHV	499	169	7500	20x9.00B	20x9.00DB
Diamond T 606	3-4	3075	Her	L	6	4½x4¾	453.0	48.6	100@2200	G	G & O	Cov	Spic	Ross	Zen	P	Aut	Cov	5	Wis	2 R	——	L4IHV	499	187½	7500	20x9.00B	20x9.00DB
Diamond T 750	4-5	4160	Her	L	6	4¾x5¼	529.0	51.3	—	G	G & O	Cov	Spft	Ross	Zen	P	Aut	Cov	5	Wis	2 R	——	W41	552	176	8300	22x9.75B	22x9.75DB
*Diamond T 801	4	4140	Her	L	6	4¾x4¾	428.4	45.9	91@2200	G	G & O	Cov	Spic	Ross	Zen	P	Aut	Br-L	7	Own	Wo	——	L6IHV	571	189½	8300	36x8P	36x8DP
*Diamond T 1200	6	5850	Her	L	6	4¾x4¾	453.3	48.6	100@2200	G	G & O	Cov	Spic	Ross	Zen	P	Aut	Br-L	7	Tim	Wo	——	T4IA	238	190	11700	34x7P	34x7DP
*Diamond T 1600	8	6220	Her	L	6	4¾x4¾	479.0	51.3	104@2400	G	G & O	Cov	Spic-Blo	Ross	Zen	P	Aut	Br-L	7	Tim	Wo	——	T4IA	238	190	11700	36x8P	36x8DP
*Diamond T 1601	8	7500	Wak	L	6	5 x5¾	677.4	60.0	127@2000	G	G & O	Br-L	Spic-Blo	Ross	Zen	P	Aut	Br-L	7	Tim	Wo	——	T4IA	238	194	12500	36x8P	36x8DP
Dodge Bros. UF 10	½	435	Own	L	4	3⅜x4¾	196.0	21.0	48@2800	G	Fed	Borg	Own	W-G	Car	P	DR	Own	3	Own	Sp	14.2	L4IH	114	109	*2050	19x5.00	19x5.00
Dodge Bros. F 10	½	515	Own	L	6	3¼x4¼	211.5	25.3	66@3200	C	Fed	Borg	Un	W-G	Car	P	DR	Own	3	Own	Sp	14.2	L4IH	114	109	2100	19x5.25	19x5.25
Dodge Bros. U 1	¾	490	Own	L	4	3⅜x4¼	196.0	21.0	45@2800	G	Fed	Borg	Spic	Han	Car	Vac	NE	Own	3	Own	Sp	21.6	L4IH	189	124	2260	20x6.00	20x6.00
Dodge Bros. DA 1	¾	595	Own	L	6	3⅜x3⅞	208.0	27.3	63@3200	C	Fed	Borg	Spic	Han	Zen	Vac	NE	Own	4	Own	Sp	36.8	L4IH	189	124	2360	20x6.00	20x6.00
Dodge Bros.	1	495	Own	L	4	3⅜x4¼	196.0	21.0	45@2800	G	Fed	Borg	Spic	Han	Car	Vac	NE	Own	3	Own	Sp	36.1	L4IH	205	133	2590	20x6.00	32x6
Dodge Bros.	1	595	Own	L	6	3⅜x3⅞	208.0	27.3	63@3200	C	Fed	Borg	Spic	Han	Zen	Vac	NE	Own	3	Own	Sp	33.4	L4IH	205	133	2690	20x6.00	32x6
Dodge Bros. UF 30	1½	595	Own	L	4	3⅜x4¾	196.0	21.0	48@2800	G	Fed	Borg	Cle	W-G	Car	P	DR	Own	4	Own	Sp	37.1	L4IH	120	136	2750	20x6.00	32x6
Dodge Bros. UF 31	1½	670	Own	L	4	3⅜x4¾	196.0	21.0	48@2800	G	Fed	Borg	Cle	W-G	Car	P	DR	Own	—	Own	Sp	32.1	L4IH	229	165	2925	20x6.00	32x6
Dodge Bros. F 31	1½	770	Own	L	6	3¼x4¼	211.5	25.3	66@3200	G	Fed	Borg	Cle	W-G	Car	P	DR	Own	—	Own	Sp	32.1	L4IH	229	165	2975	20x6.00	32x6
Dodge Bros. F 30	1½	695	Own	L	6	3¼x4¼	211.5	25.3	66@3200	G	Fed	Borg	Cle	W-G	Car	P	DR	Own	4	Own	Sp	37.1	L4IH	120	136	2890	20x6.00	32x6
Dodge Bros. F 35	1½	1425	Own	L	6	3⅜x3⅞	208.0	27.3	63@3200	G	Long	Borg	Cle	Han	Zen	P	DR	Own	4	Own	Sp	41.4	L4IH	311	140	3975	20x6.00	20x6.00D
Dodge Bros. F 36	1½	1485	Own	L	6	3⅜x3⅞	208.0	27.3	63@3200	G	Long	Borg	Cle	Han	Zen	P	DR	Own	4	Own	Sp	41.4	L4IH	311	165	4175	20x6.00	20x6.00D
*Dodge Bros. F 40	2	1995	Own	L	6	3⅜x5	309.6	31.5	96@3000	G	Long	Borg	Cle	Sag	DL	P	DR	Own	4	Own	Sp	43.7	L4IH	350	150	5425	20x6.50	20x6.50D
*Dodge Bros. F 41	2	2085	Own	L	6	3⅜x5	309.6	31.5	96@3000	G	Long	Borg	Cle	Sag	DL	P	DR	Own	4	Own	Sp	43.7	L4IH	350	165	5465	20x6.50	20x6.50D
Dodge Bros.	3	1515	Own	L	6	3¾x4½	241.0	27.3	78@3000	C	Long	Borg	Un	Han	Zen	Vac	NE	Own	4	Own	Sp	46.3	L4IH	382	135	4235	32x6	32x6D
Dodge Bros.	3	1565	Own	L	6	3¾x4½	241.0	27.3	78@3000	C	Long	Borg	Un	Han	Zen	Vac	NE	Own	4	Own	Sp	41.4	L4IH	382	165	4520	32x6	32x6D
Dodge Bros.	3	1615	Own	L	6	3¾x4½	241.0	27.3	78@3000	C	Long	Borg	Un	Han	Zen	Vac	NE	Own	4	Own	Sp	46.3	L4IH	382	185	4715	32x6	32x6D
Dodge Bros. F 60	3	2645	Own	L	6	3⅜x5	309.6	31.5	96@3000	G	Long	Borg	Cle	Sag	DL	P	DR	Own	4	Own	2 R	48.8	L4IH	416	146	5835	32x6	32x6D
*Dodge Bros. F 61	3	2575	Own	L	6	3⅜x5	309.6	31.5	96@3000	G	Long	Borg	Cle	Sag	DL	P	DR	Own	4	Own	Sp	48.8	L4IH	416	170	6075	32x6	32x6D
*Dodge Bros. F 62	3	2695	Own	L	6	3⅜x5	309.6	31.5	96@3000	G	Long	Borg	Cle	Sag	DL	P	DR	Own	4	Own	Sp	48.8	L4IH	416	195	6190	32x6	32x6D
Essex Com.	¾	445	Own	L	6	2¾x4½	163.0	18.2	55@3300	C	Har	Own	Spic	Gem	Mar	Vac	Aut	Own	3	Own	Sp	—	4M	..	110	*2125	20x5	20x5.50
Federal D	1½	795	Con	L	6	3⅞x4¼	200.5	24.0	48@2500	C	Long	Borg	Spic	Gem	Zen	P	DR	W-G	4	Cla	Sp	40.8	L4IH	377	131	*3280	20x6.00	32x6
Federal E 6	1½	895	Con	L	6	3⅜x4	215.0	27.3	60@2600	C	Long	Borg	Spic	Gem	Zen	P	DR	W-G	4	Cla	Sp	36.3	L4IH	377	132	3330	20x6.00	32x6
Federal F 7	1¾	1525	Con	L	6	3⅜x4⅝	248.0	27.3	64@2500	C	Long	Borg	Spic	Gem	Zen	P	DR	Own	4	Tim	Sp	29.2	L4IH	414	132	3810	30x5	30x5D
Federal A 6	2	1855	Con	L	6	3⅜x4⅝	248.0	27.3	64@2500	C	Long	Borg	Pet	Ross	Zen	Vac	DR	Own	4	Cla	Sp	38.5	L4IH	450	151	4635	32x6	32x6D
Federal A 6 T	2½	2185	Con	L	6	3⅜x4⅝	248.0	27.3	64@2500	C	Long	Borg	Pet	Ross	Zen	Vac	DR	Own	4	Tim	Sp	47.1	L4IHV	659	151	5185	32x6	32x6D
Federal A 6 T W	2½	2360	Con	L	6	3⅜x4⅝	248.0	27.3	64@2500	C	Long	Borg	Pet	Ross	Zen	Vac	DR	Own	4	Tim	Wo	52.8	L4IHV	659	151	5185	32x6	32x6D
*Federal D S W	2½-3	1050	Con	L	4	3⅞x4¼	200.5	24.0	48@2500	C	Long	Borg	Spic	Gem	Zen	P	DR	W-G	4	Cla	Sp	40.8	L6IH	566	140	3980	20x6.00	32x6
*Federal E 6 S W	2½-3	1150	Con	L	6	3⅜x4	215.0	27.3	60@2600	C	Long	Borg	Spic	Gem	Zen	P	DR	W-G	4	Cla	Sp	40.8	L6IH	566	145	4030	20x6.00	32x6
Federal T 10 R	2½-3	2740	Con	H	6	4 x4⅛	311.0	38.4	75@2200	C	Long	Borg	Pet	Ross	Zen	P	DR	Own	4	Tim	Sp	44.5	L4IHV	659	165	6845	34x7	34x7D
Federal T 10 W	2½-3	2915	Con	H	6	4 x4⅛	311.0	38.4	75@2200	C	Long	Borg	Pet	Ross	Zen	P	DR	Own	4	Tim	Wo	44.0	L4IHV	659	165	6645	34x7	34x7D
Federal T 10 D R	2½-3	2915	Con	H	6	4 x4⅛	311.0	38.4	75@2200	C	Long	Borg	Pet	Ross	Zen	P	DR	Own	4	Tim	2 R	45.6	L4IHV	659	165	6845	34x7	34x7D
Federal U 6	3-3½	3860	Con	H	6	4 x4½	339.0	38.4	85@2200	C	Long	Borg	Pet	Ross	Str	P	DR	Br-L	7	Tim	Wo	64.6	L4IHV	676	165	7315	34x7	34x7D
Federal U 6 D R	3-3½	3860	Con	H	6	4 x4½	339.0	38.4	85@2200	C	Long	Borg	Pet	Ross	Str	P	DR	Br-L	7	Tim	2 R	69.6	L4IHV	767	165	7315	34x7	34x7D
Federal 4 C 6 A	4-5	4735	Con	H	6	4¼x4¾	381.0	40.8	90@2200	C	Long	Borg	Pet	Ross	Zen	P	DR	Br-L	7	Tim	Wo	72.2	L4IHV	894	192	8460	36x8	36x8D
Federal 4 C 6 A D R	4-5	4735	Con	H	6	4¼x4¾	381.0	40.8	90@2200	C	Long	Borg	Pet	Ross	Zen	P	DR	Br-L	7	Tim	2 R	80.6	L4IHV	894	192	8460	36x8	36x8D
Federal 4 C 6 A B	4-5	4960	Con	H	6	4¼x4¾	381.0	40.8	90@2200	C	Long	Borg	Pet	Ross	Zen	P	DR	Br-L	7	Tim	Wo	72.2	T4IA	921	192	8980	36x8	36x8D
Federal 4 C 6 A B D R	4-5	4960	Con	H	6	4¼x4¾	381.0	45.9	90@2200	C	Long	Borg	Pet	Ross	Zen	P	DR	Br-L	7	Tim	2 R	80.6	T4IA	421	192	8980	36x8	36x8D
*Federal U 6 S W	6	6000	Con	H	6	4¼x4¾	380.9	40.8	90@2200	C	Long	Borg	Pet	Ross	Zen	P	DR	Br-L	7	Tim	Wo	71.3	L6IHV	1093	201	10395	34x7	34x7D
*Federal U 6 S W A B	6	6500	Con	H	6	4¼x4¾	380.9	40.8	90@2200	C	Long	Borg	Pet	Ross	Zen	P	DR	Br-L	7	Tim	Wo	71.3	TrIA	867	201	10395	34x7	34x7D
Federal X 8	7½	5085	Con	L	4	5 x6	471.0	40.0	61@1350	G	Long	Borg	Pet	Gem	Zen	Vac	AB	Br-L

Major Specifications and Mechanical Details of 1931 Commercial Cars

(CONTINUED FROM PAGE EIGHT)

Make and Model	Capacity—Tons or Lbs.	Chassis Price	Engine	Valve Arr'g'm't	No. of Cyls.	Bore and Stroke	Piston Disp.	Tax H. P.	Max. Brake H. P. and Peak R. P. M.	Type Camshaft Drive	Radiator Make	Clutch Make	Universals Make	Steering Gear Make	Carburetor Make	Fuel Feed Type	Make Electr'l System	Transmission	No. Spds. For.	Rear Axle Make	Type Final Drive	Final Gear Reduction	Type Service Brakes	Area Service Brakes	Standard Wheel Base	Chassis Wgt.	Standard Tire Sizes Front	Rear
General Motors T 42	*15000	1845	Buick	H	6	3 1/4x4 5/8	257.5	28.3	76@2500	G	Long	Own	Spic	Sag	Mar	P	DR	Mun	4	Eat	Sp	33.4	B4IM	524	141	4725	32x6P	32x6DP
General Motors T-44	*16000	2095	Buick	H	6	3 1/4x4 5/8	257.5	28.3	76@2500	G	Long	Own	Spic	Sag	Mar	P	DR	Mun	4	Eat	2 R	40.9	B4IM	524	141	*005	34x7P	34x7DP
General Motors T-51	*19000	2565	Own	H	6	3 3/4x5	331.4	33.7	94@2500	G	Long	Own	Spic	Sag	Mar	P	DR	Mun	4	Eat	Sp	40 6	B4IM	574	155	5955	34x7P	34x7DP
General Motors T-58	*19000	2690	Own	H	6	3 3/4x5	331.4	33.7	94@2500	G	Long	Own	Spic	Sag	Mar	P	DR	Mun	4	Eat	2 R	49.8	B4JM	574	155	6095	34x7P	34x7DP
General Motors T-60	*22000	3035	Buick	H	6	3 3/4x5	331.4	33.7	94@2500	G	Long	Own	Spic	Sag	Mar	P	DR	Mun	4	Tim	Wo	52.5	B4IM	685	154	6925	34x7P	34x7DP
General Motors T-61	*22000	3445	Own	H	6	3 3/4x5	331.4	33.7	94@2500	G	Long	Own	Spic	Sag	Str	P	DR	Mun	4	Tim	Wo	52.5	B4IMV	685	154	6965	20x9.00B	20x9.00DB
General Motors T-82	*24000	3795	Own	H	6	3 3/4x5	331.4	33.7	94@2500	G	Long	Own	Pet	Sag	Str	P	Dr	Mun	12	Tim	Wo	142.5	B4IM	793	155	7500	20x9.00B	20x9.00DB
General Motors T-83	*24000	3990	Own	H	6	3 3/4x5	331.4	33.7	94@2500	G	Long	Own	Spic	Sag	Str	P	Dr	Mun	12	Tim	Wo	142.5	B4IMV	865	155	7670	20x9.00B	20x9.00DB
General Motors T-85	*26000	5600	Own	H	6	4 1/4x5 1/2	468.0	43.3	115@2200	G	Long	Own	Spic	Sag	Str	P	DR	Ful	4	Tim	2 R	53.3	B4IMV	865	171	10630	20x9.75DB	20x9.75DB
†General Motors T-99	*28000	5285	Own	H	6	3 3/4x5	331.4	33.7	94@2500	G	Long	Own	Pet	Sag	Str	P	DR	Mun	12	Tim	Wo	129.0	BrIA	868	185	9400	20x7.50B	20x7.50DB
†General Motors T-95	*34000	7545	Own	H	6	4 1/4x5 1/2	468.0	43.3	115@2200	G	Long	Own	Spic	Sag	Str	P	DR	Ful	4	Tim	Wo	53.3	B6IA	1191	189	13250	34x7P	34x7DP
†General Motors T-96	*34000	7195	Own	H	6	4 1/4x5 1/2	468.0	43.3	115@2200	C	Long	Own	Spic	Sag	Str	P	DR	Ful	4	Tim	2 R	51.1	B6IA	1191	189	12850	34x7P	34x7DP
Gramm A X 4	1	795	Con	L	4	3 1/8x4	200.4	24.0	50@2800	C	Per	Jon	Blo	Ross	Til	P	Aut	W-G	4	Tim	Sp	36.3	L4IH	380	131	*3300	20x6.00	20x6.50
Gramm A X 6	1	895	Con	L	6	3 1/8x4	214.0	27.3	61@3000	C	Per	Jon	Blo	Ross	Til	P	Aut	W-G	4	Tim	Sp	36.3	L4IH	380	131	3550	20x6.00	20x6.50
Gramm B X 4	1 1/2	895	Con	L	4	3 1/8x4 1/4	200.4	24.0	50@2800	C	Per	Jon	Blo	Ross	Til	P	Aut	W-G	4	Tim	Sp	36.3	L4IH	380	131	3475	20x6.00	20x6.00D
Gramm B X 6	1 1/2	995	Con	L	6	3 1/8x4	214.7	27.3	61@3000	C	Per	Jon	Blo	Ross	Til	P	Aut	W-G	4	Tim	Sp	36.3	L4IH	380	131	3725	20x6.00	20x6.00D
Gramm B	1 3/4	1495	Lyc	L	6	3 1/4x4 1/2	224.0	25.3	61@2900	G	Per	Own	Blo	Ross	Zen	Vac	Aut	Cov	4	Tim	Sp	34.3	L4IH	278	140	4150	20x6.50	20x6.50D
†Gramm C X 4	2	1095	Con	L	4	4 1/8x4 1/4	227.0	27.2	55@2600	G	Per	Jon	Blo	Ross	Til	P	Aut	W-G	4	Tim	Sp	37.0	L4IH	452	131	3900	20x6.50	20x6.50D
Gramm 16	2	1098	Knight	S	6	2 1/2x4 3/8	177.9	20.7	53@2600	C	Own	Borg	Blo	Ross	Til	Vac	Aut	Cov	4	Eat	Sp	—	—	—	151	——	30x5	32x6
Gramm C X 6	2	1295	Con	L	6	3 3/8x4 3/8	248.2	27.3	70@3000	C	Per	Jon	Blo	Ross	Til	P	Aut	W-G	4	Tim	Sp	37.0	L4IH	452	131	4150	20x6.50	20x6.50D
Gramm 21	2 1/2	1295	Knight	S	6	3 3/8x4 3/8	255.	27.3	70@2600	C	Own	Jon	Blo	Ross	Til	Vac	Aut	Cov	4	—	—	—	—	—	164	——	32x6	34x7
Gramm C	2	1795	Lyc	L	6	3 5/8x4 1/2	278.6	31.5	82@2600	G	Per	Own	Blo	Ross	Zen	P	Aut	Cov	4	Tim	Sp	31.0	L4IH	353	160	4800	20x7.00	20x7.00D
Gramm D	2 1/2	1995	Lyc	L	6	3 3/4x4 1/2	299.0	33.7	90@2200	G	Per	Jon	Blo	Ross	Zen	P	Aut	Cov	4	Tim	Sp	33.0	L4IHV	339	160	5200	20x7.50	20x7.50D
Gramm 75	3	2395	Knight	S	6	3 3/8x4 3/8	255.	27.3	70@2600	C	Own	Jon	Blo	Ross	Til	Vac	Aut	Cov	4	Wis	2R	—	——	—	160	——	20x7.50	20x7.50D
Gramm E	3	2595	Lyc	L	6	3 7/8x5	353.8	36.0	90@2200	C	Per	Own	Blo	Ross	Zen	P	Aut	Cov	4	Tim	Sp	35.0	L4IHV	659	160	5950	20x8.25	20x8.25D
Gramm E Y	3	3595	Con	H	6	4 1/8x4 3/4	380.8	40.8	90@2200	C	Per	Ful	Blo	Ross	Zen	P	Aut	Cov	4	Tim	Sp	30.0	L4IHA	—	190	7200	20x7.50	20x7.50D
Gramm G Y	4	4345	Con	H	6	4 3/8x4 3/4	428.4	45.9	100@2200	C	Per	Ful	Blo	Ross	Zen	P	Aut	Cov	4	Wis	2 R	28 0	BW4IM	—	210	7700	20x8.25	20x8.25D
Gramm G W	4	5175	Con	H	6	4 3/8x4 3/4	428.0	45.9	100@2200	C	Per	Ful	Blo	Ross	Zen	P	Aut	Cov	4	Wis	2 R	—	4IA	864	187	9500	20x9.00	20x9.00D
Gramm H Y	5	6545	Con	L	6	4 3/8x5 3/4	611.4	54.1	127@2300	G	Per	Ful	Blo	Ross	Zen	P	Aut	Ful	4	Wis	2 R	25.2	4IA	—	236	10100	36x8	36x8D
Indiana 60	*6000	995	Con	L	6	3 3/8x4	214.7	27.3	61@3000	C	G & O	Borg	Spic	Ross	Zen	P	Aut	W-G	3	Col	Sp	19.8	E4IM	297	132	*3200	30x5	30x5
Indiana 64	6500	1195	Con	L	6	3 3/8x4 5/8	248.2	27.3	65@2700	C	Long	Borg	Spic	Ross	Str	Vac	Aut	Br-L	3	Col	Sp	21.3	C4IM	244	137	3400	30x5	30x5
Indiana 74	7500	1290	Con	L	6	3 3/8x4 5/8	248.2	27.3	65@2700	C	Long	Borg	Spic	Ross	Str	Vac	Aut	Br-L	4	Col	Sp	25.6	C4IM	190	137	3450	32x6	32x6
Indiana 80	9000	1525	Con	L	6	3 3/8x4 5/8	248.2	27.3	65@2700	C	Long	Borg	Spic	Ross	Str	Vac	Aut	Br-L	4	Wis	Sp	20.9	C4IM	292	149	4050	32x6	32x6
Indiana 111 XW	12500	1850	Her	L	4	4 x5	251.3	25.6	46@2000	G	McC	Borg	Spic	Ross	Str	Vac	Aut	Br-L	4	Wis	2 R	35.2	K2IM	270	120	3740	32x6	32x6D
Indiana 120	12000	1990	Con	H	6	4 x4 1/8	311.0	38.4	73@2400	C	G & O	Br-L	Spic	Ross	Str	P	Aut	Br-L	4	Tim	Sp	31.3	L4IH	353	156	5200	32x6	32x6D
Indiana 140	14000	2495	Con	H	6	4 x4 1/8	311.0	38.4	73@2400	C	G & O	Br-L	Spic	Ross	Str	P	Aut	Br-L	4	Wis	2 R	35.3	54IHV	356	156	5400	32x6	32x6D
Indiana 141	17000	2935	Con	H	6	4 x4 1/8	311.0	38.4	73@2400	C	G & O	Br-L	Spic	Ross	Str	P	Aut	Br-L	4	Wis	2 R	46.2	L4IHV	380	170	6200	32x6	32x6D
Indiana 150	17000	3160	Con	H	6	4 1/8x4 3/4	380.9	40.8	89@2400	C	G & O	Br-L	Spic	Ross	Str	P	Aut	Br-L	4	Wis	2 R	46.6	L4IHV	380	170	6800	32x6	32x6D
Indiana 155	17500	3660	Con	H	6	4 3/8x4 3/4	427.5	45.9	100@2400	C	G & O	——	Spic	Ross	Str	P	Aut	——	5	Wis	2 R	45.3	L4IHV	380	170	7200	34x7	34x7D
Indiana 195	19500	3820	Con	H	6	4 1/8x4 3/4	380.9	40.8	89@2400	C	G & O	Br-I	Spic	Ross	Str	P	Aut	Br-L	4	Wis	2 R	49.5	L4IHV	471	170	7500	34x7	34x7D
Indiana 190	21000	4185	Con	H	6	4 1/8x4 3/4	380.9	40.8	89@2400	C	Long	Borg	Spic	Ross	Str	P	Aut	Br-L	7	Tim	Wo	78.6	T2IMV	500	168½	7625	34x7	34x7D
Indiana 220	22000	4560	Con	H	6	4 3/8x4 3/4	427.5	45.9	100@2400	C	G & O	Br-L	Spic	Ross	Str	P	Aut	Br-L	4	Wis	2 P	50.7	L4IHV	546	170	8200	36x8	36x8D
Indiana 250	25000	5950	Con	H	6	4 3/8x4 3/4	427.5	45.9	100@2400	C	Long	Br-L	Spic	Ross	Str	P	Aut	Br-L	4	Tim	Wo	63.7	LT4IHV	664	182	10000	40x8	40x8D
Indiana 290	30000	7250	Con	L	6	4 3/4x5 3/4	611.4	54.1	116@1800	C	Long	Br-L	Spic	Ross	Str	P	L-N	Br-L	7	Tim	Wo	95.0	T4IA	676	182	10750	38x7P	40x14S
*Indiana 640	40000	9700	Con	L	6	4 3/4x5 3/4	611.4	54.1	116@1800	C	Long	Br-L	Spic	Ross	Str	P	L-N	Br-L	7	Tim	Wo	90 9	T4IA	864	212	14000	38x7P	36x10S
International A 2	1 1/2	675	Wak	L	4	3 5/8x4 1/2	186.0	21.0	39@2400	G	Mod	Mec	Mec	Ross	Zen	Vac	DR	W-G	4	Own	Sp	39.5	BE4IM	212	136	*2935	5.50x20	6.00x20
International B 2	1 1/2	725	Wak	L	4	3 5/8x4 1/2	186.0	21.0	39@2400	G	Mod	Mec	Mec	Ross	Zen	Vac	DR	Mec	3	Own	Sp	47.3	BE4IM	212	136	2960	5.50x20	6.00x20
International A L 3	1 1/2	1450	Lyc	L	6	3 1/4x4 1/2	224.0	25.3	52@2700	G	Mod	Own	Mec	Ross	Zen	Vac	DR	W-G	4	Own	Sp	42.9	B4IM	295	138	4032	20x6.00	20x6.00D
International A 4	2	1860	Own	H	6	3 5/8x4 1/2	279.0	31.5	67@2600	G	Mod	Own	Mec	Ross	Zen	Vac	DR	Own	5	Own	Sp	47.8	BE4IM	378	145	5221	32x6	32x6D
International A 5	3	2550	Own	H	6	3 5/8x4 1/2	279.0	31.5	67@2600	G	Mod	Own	Mec	Ross	Zen	Vac	DR	Own	5	Own	Sp	52.6	BE4IM	430	156	5895	34x7	34x7D
International A 6	3	2675	Own	H	6	3 5/8x4 1/2	279.0	31.5	67@2600	G	Mod	Own	Mec	Ross	Zen	Vac	DR	Own	5	Own	Sp	62.5	BE4IM	430	156	6120	34x7	34x7D
International W 1	2 1/2	3850	Hall	H	4	4 1/4x5 1/2	312.0	28.9	59@2000	C	Own	Own	Own	Own	Zen	Vac	RB	Own	5	Own	2 R	60.5	BE4IM	710	148	8300	36x8S	36x8S
International W 2	3 1/2	4850	Hall	H	4	4 3/4x5 1/2	390.0	36.1	69@2000	C	Own	Own	Own	Own	Zen	Vac	RB	Own	5	Own	2 R	70.5	BE4IM	794	160	10125	36x8S	40x12S
La France Rep. A 1	6000	795	Lyc	L	6	3 x4 3/4	201.5	21.5	60@2500	G	G & O	Borg	Spic	Han	Zen	Vac	Aut	Ful	4	Tim	Sp	36.1	L4IH	378	132	3000	20x5.50	32x6
La France Rep. C 1	7500	1295	Lyc	L	6	3 1/4x4 1/2	224.0	25.4	61@2750	G	G & O	Borg	Spic	Han	Zen	Vac	Aut	Ful	4	Tim	Sp	29.1	L4IH	413	144	3360	20x6.00	32x6
La France Rep. D 1	9000	1595	Lyc	L	6	3 1/4x4 1/2	224.0	25.4	61@2750	G	G & O	Borg	Spic	Han	Zen	Vac	Aut	Ful	4	Tim	Sp	37.9	L4IH	448	144	3725	30x5	30x5D
La France Rep. F-3	13000	2395	Lyc	L	6	3 3/4x4 1/2	299.0	33.7	80@2500	G	Per	Ful	Spic	Han	Zen	P	Aut	Ful	4	Tim	Sp	40.1	L4IHV	628	174	5520	34x7	34x7
La France Rep. H 2	16000	2985	Lyc	L	6	3 7/8x5	354.0	36.0	85@2300	G	Per	Ful	Spic	Han	Zen	P	Aut	Ful	4	Wis	2 R	41.6	L4IHV	658	174	6370	34x7	34x7D
La France Rep. M 2	20000	4000	Wak	L	6	4 3/8x5 1/2	462.0	46.0	97@2000	G	Per	Ful	Spic	Han	Zen	P	Aut	Ful	5	Wis	2 R	48.1	L4IHV	768	174	7500	36x8	36x8D
La France Rep. 35-2	24000	5600	Wak	L	6	4 1/2x5 3/4	549.0	48.6	98@1850	G	Own	Ful	Spic	Han	Zen	P	Aut	Ful	4	Wis	2 R	45.4	L4IHV	870	174	9250	38x9	38x9D
Maccar 36 A	1 1/2	1900	Bud	L	6	3 3/4x4 1/2	298.0	33.7	83@2800	G	Per	Br-L	Spic	Ross	Str	P	DR	Br-L	4	Tim	Sp	30.6	L4IH	315	171	4850	32x6	32x6D
Maccar 40 A	2	2400	Bud	L	6	3 3/4x4 1/2	298.0	33.7	83@2800	G	Per	Br-L	Spic	Ross	Str	P	DR	Br-L	4	Tim	Sp	38.8	L4IHV	325	171	5340	32x6	32x6D
Maccar 56	3	3350	Bud	L	6	3 3/4x5	331.4	33.7	72@2100	G	Per	Br-L	Spic	Ross	Str	Vac	DR	Br-L	4	Wis	2 R	37.4	L4IHV	411	183	6200	34x7	34x7D
Maccar 60	3	3950	Bud	L	6	4 1/8x5 1/8	411.0	40.8	107@2100	G	Per	Br-L	Spic	Ross	Str	Vac	DR	Br-L	4	Tim	Wo	34.3	L4IHV	411	183	6600	20x9.00	20x9.00D
Maccar 66 A	4	5500	Her	L	6	4 3/8x4 3/4	479.0	51.3	106@2100	G	Per	Br-L	Spic	Ross	Zen	Vac	DR	Br-L	7	Tim	Wo	64.5	W4IA	617.5	206	8200	20x9.75	20x9.75D
Maccar 86 A	5	5950	Her	L	6	4 3/8x4 3/4	479.0	51.3	106@2100	G	Per	Br-L	Spic	Ross	Zen	Vac	DR	Br-L	7	Tim	Wo	72.3	W4IA	623	206	9500	20x10.50	20x10.50D
†Maccar SW-86	10	7650	Her	L	6	4 3/8x4 3/4	479.0	51.3	106@2100	G	Per	Br-L	Spic	Ross	Zen	Vac	DR	Br-L	7	Tim	Wo	72.3	T6IA	103	206	11760	20x9.75	26x9.75D
††Mack B L	——	2500	Own	L	6	3 1/4x5	248.9	28.3	63@2800	G	Own	Own	Spic	Gem	Str	Vac	NE	Own	4	Tim	Sp	Opt	L4IH	302	148	*4450	20x6.00B	20x6.00DB
††Mack B G	——	3000	Own	L	6	3 3/4x5	309.6	31.5	75@2600	G	Own	Own	Spic	Own	Str	Vac	NE	Own	4	Own	Sp	Opt	O4IV	415	156	5200	32x6	32x6D
††Mack A B	——	4350	Own	L	4	4 1/4x5	283.7	28.9	60@2200	G	Own	Own	Spic	Own	Str	Gra	NE	Own	4	Own	2 R	Opt	O4IV	471	146½	7100	34x7	34x7D
Mack A B	——	4000	Own	L	4	4 1/4x5	283.7	28.9	60@2200	G	Own	Own	Spic	Own	Str	Vac	NE	Own	4	Own	Ch	Opt	O4IV	471	146½	6850	34x7	34x7D
Mack A B	——	4500	Own	L	6	3 5/8x5	309.6	31.5	75@2600	G	Own	Own	Spic	Own	Str	Gra	NE	Own	4	Own	2 R	Opt	O4IV	471	146½	7050	34x7	34x7D
††Mack A B	——	4150	Own	L	6	3 5/8x5	309.6	31.5	75@2600	G	Own	Own	Spic	Own	Str	Vac	NE	Own	4	Own	Ch	Opt	O4IV	471	146½	6850	34x7	34x7D
††Mack B C	——	5250	Own	L	6	4 x5 1/2	417.7	38.4	100@2300	G	Own	Own	Spic	Own	Str	Vac	NE	Own	4	Own	2 R	Opt	O4IV	471	154	8350	36x8	36x8D
††Mack B C	——	5500	Own	L	6	4 x5 1/2	417.7	38.4	100@2300	G	Own	Own	Spic	Own	Str	Vac	NE	Own	4	Own	Ch	Opt	O4IV	610	154	8500	36x8	36x8D
††Mack B J	——	6150	Own	L	6	4 1/2x5 1/2	525.2	48.6	126@2200	G	Own	Own	Spic	Own	Str	Vac	L-N	Own	4	Own	2 R	Opt	O4IV	567	168½	10100	36x8	36x8D
††Mack A K	——	5150	Own	L	4	5 x6	471.2	40.0	77@1800	G	Own	Own	Spic	Own	Str	Gra	RB	Own	4	Own	Ch	Opt	O4IV	492	162	9800	36x58	36x5DS
††Mack A K	——	5250	Own	L	4	5 x6	471.2	40.0	77@1800	G	Own	Own	Spic	Own	Str	Gra	RB	Own	4	Own	2 R	Opt	O4IV	492	162	9700	36x58	36x5DS
††Mack A C	——	4950	Own	L	4	5 x6	471.2	40.0	77@1800	G	Own	Own	Spic	Own	Str	Gra	RB	Own	4	Own	Ch	Opt	OJXM	194	156	9500	36x58	40x6DS
††Mack A K	——	6450	Own	L	6	4 1/2x5 1/2	525.5	48.6	126@2200	G	Own	Own	Spic	Han	Str	Vac	L-N	Own	4	Own	2 R	Opt	O4IV	492	174	10950	22x10.50B	22x10.50DS
††Mack A C	——	5500	Own	L	4	5 x6	471.2	40.0	77@1800	G	Own	Own	Spic	Own	Str	Gra	RB	Own	4	Own	Ch	Opt	OJXM	194	156	10100	36x6S	40x6DS
††Mack A C	——	6550	Own	L	6	4 1/2x5 1/2	525.5	48.6	126@2200	G	Own	Own	Spic	Han	Str	Vac	L-N	Own	4	Own	Ch	Opt	O4IV	492	174	11950	24x10.50B	24x10.50DB
††Mack A C	——	6000	Own	L	4	5 x6	471.2	40.0	77@1800	G	Own	Own	Spic	Own	Str	Gra	RB	Own	4	Own	Ch	Opt	OJXM	194	156	10450	36x7S	40x7DS
††Mack A P	——	9500	Own	L	6	5 x6	706.5	60.0	150@2000	G	Own	Own	Spic	Own	Str	Gra	NE	Own	4	Own	Ch	Opt	O2IV	287	191	12200	36x7S	40x8DS
††Mack A K 6—6 wheel	——	9500	Own	L	6	4 1/2x5 1/2	525.2	48.6	126@2200	G	Own	Own	Spic	Own	Str	Vac	L-N	Own	4	Own	2 R	Opt	ON1A	574	152-52	16300	9.75x22D	9.75x22DB
††Mack A C 6 wheel	——	7650	Own	L	4	5 x6	471.2	40.0	77@1800	G	Own	Own	Spic	Own	Str	Gra	RB	Own	4	Own	Ch	Opt	ORIV	574	125-52	13800	36x6S	40x12S
††Mack A C 6—6 wheel	——	9000	Own	L	6	4 1/2x5 1/2	525.2	48.6	126@2200	G	Own	Own	Spic	Own	Str	Vac	L-N	Own	4	Own	Ch	Opt	O6IA	574	145-52	14950	40x8	40x8D
Mack A P 6 wheel	——	11500	Own	L	6	5 x6	706.5	60.0	150@2000	G	Own	Own	Spic	Own	Str	Gra	NE	Own	4	Own	Ch	Opt	O6IA	574	145-52	16250	40x8	40x8D
††Mack A P 6 wheel	——	12000	Own	L	6	5 x6	706.5	60.0	150@2000	G	Own	Own	Spic	Own	Str	Gra	NE	Own	4	Own	2 R	Opt	O6IA	574	145-52	——	22x9.75B	22x9.75B
Paige	½	*895	Own	L	6	3 1/8x4 1/2	207.0	23.4	66@3200	C	Long	Long	Un	Ross	DL	T	DR	—	3	——	Sp	14.2	4HI	264	115	†2350	18x5.50B	18x5.50B
Pierce-Arrow P T	12000	2950	Own	L	6	3 3/4x4 1/2	298.0	33.5	70@2600	G	Long	Long	Cle	Han	Zen	P	DR	Cla	4	Tim	Sp	——	B4IMV	388	160	*5600	20x7.50B	20x7.50B
Pierce-Arrow P W	18000	4150	Own	L	6	4 1/8x4 1/2	361.0	40.3	77@2400	G	Long	Long	Cle	Han	Zen	P	DR	Cov	4	Tim	*Wo	——	W4IA	488	150	6600	20x9.00B	20x9.00B
Pierce-Arrow P X	24000	5375	Own	L	6	4 5/8x4 3/4	479.0	51.3	103@2200	G	Long	Long	Cle	Han	Zen	P	DR	Cov	4	Tim	*Wo	——	W4IA	610	160	9300	20x10.50B	20x10.50B
Pierce-Arrow P Y	28000	5950	Own	L	6	4 5/8x4 3/4	479.0	51.3	103@2200	G	Long	Long	Cle	Han	Zen	P	DR	Cov	4	Own	*Wo	——	W5IA	701	160	10675	24x10.50B	24x10.50B
Pierce-Arrow P Z	34000	6950	Own	L	6	4 3/4x5 1/4	611.0	54.1	130@2000	G	Long	Long	Cle	Han	Zen	P	DR	Own	4	Own	*Wo	——	W5IA	702	168	12800	36x7B	40x16B
Relay Series 15 AA	¾	1370	Con	L	6	3 3/8x4	214.7	27.3	52@2200	C	Long	Borg	Blo	Han	Str	Vac	Aut	W-G	4	Own	2R	38.4	L4IH	297	131	3750	30x5P	30x5P
Relay Series 15 AB	1	1400	Con	L	6	3 3/8x4	214.7	27.3	52@2200	C	Long	Borg	Blo	Han	Str	Vac	Aut	W-G	4	Own	2R	38.4	L4IP	297	131	3800	30x5P	30x5P
Relay Series S 11	1	1700	Bud	L	6	3 3/8x4 1/2	241.6	27.3	53@2200	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Own	2R	25.5	L4IP	297	142	4050	30x5P	30x5P
Relay Series S 11	1½	1900	Bud	L	6	3 3/8x4 1/2	241.6	27.3	53@2200	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Own	2R	30.0	L4IH	297	162	4500	30x5P	30x5DP
Relay Series 40	1½	2990	Bud	L	6	3 3/8x5	309.6	31.5	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Own	2R	34.5	L4IH	394	168	5300	34x5P	34x5DP
Relay Series 40	2	3240	Bud	L	6	3 3/8x5	309.6	31.5	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Own	2R	34.5	L4IH	394	168	5500	36x6	36x6D
Relay Series 50	2	3260	Bud	L	6	3 3/8x5	331.0	33.7	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	5	Own	2R	58.5	L4IH	584	161	6800	36x6	36x6D
Relay Series S 11	2	2030	Bud	L	6	3 3/8x4 1/2	241.6	27.3	53@2200	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Own	2R	30.0	L4IP	297	162	4700	32x6P	32x6DP
Relay Series 40	2½	3275	Bud	L	6	3 3/8x5	309.6	31.5	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Own	2R	34.5	L4IH	394	168	5700	36x6	36x6D
Relay Series 50	2½	4000	Bud	L	6	3 3/8x5	331.0	33.7	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	5	Own	2R	58.5	L4IH	584	161	7000	36x6	36x7D
Relay Series 60	2½	4555	Bud	L	6	4 1/8x5 1/8	410.9	40.8	83@2100	G	Long	Ful	Blo	Han	Zen	Vac	Aut	Ful	5	Own	2R	58.5	L4IP	584	175	7350	36x6	36x6D
Relay Series 50	3	4130	Bud	L	6	3 3/4x5	330.0	33.7	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	5	Own	2R	58.5	L4IH	584	161	7200	36x6	40x8D
Relay Series 60	3	4595	Bud	L	6	4 1/8x5 1/8	410.9	40.8	83@2100	G	Long	Ful	Blo	Han	Zen	Vac	Aut	Ful	5	Own	2R	58.5	L4IH	584	175	7500	36x6	38x7D
Relay Series 80	3	5170	Bud	L	6	4 1/8x5 1/8	411.0	40.8	83@2100	G	Long	Borg	Blo	Ross	Zen	Vac	Aut	Cov	8	Own	2R	84.1	——	—	175	8400	36x6	40x10S
Relay Series 60	3½	4745	Bud	L	6	4 1/8x5 1/8	410.9	40.8	83@2100	G	Long	Ful	Blo	Han	Zen	Vac	Aut	Ful	5	Own	2R	58.5	L4IH	584	175	7800	38x7	40x8D
Relay Series 80	3½	5330	Bud	L	6	4 1/8x5 1/8	411.0	40.8	83@2100	G	Long	Borg	Blo	Ross

Major Specifications and Mechanical Details of 1931 Commercial Cars

(CONTINUED FROM PAGE NINE)

Make and Model	Capacity—Tons or Lbs.	Chassis Price	Engine	Valve Arr'g'm't	No. of Cyls.	Bore and Stroke	Piston Disp.	Tax H. P.	Max. Brake H. P. and Peak R. P. M.	Type Camshaft Drive	Radiator Make	Clutch Make	Universals Make	Steering Gear Make	Carburetor Make	Fuel Feed Type	Make Electr'l System	Make Transmission	No. Spds. For.	Rear Axle Make	Type Final Drive	Final Gear Reduction	Type Service Brakes	Area Service Brakes	Standard Wheel Base	Chassis Wgt.	Standard Tire Sizes Front	Rear
Selden 67 C	5	4975	Con	H	6	4¾x4½	427.0	45.9	100@2400	C	Own	Br-L	Spic	Ross	Str	Vac	Aut	Br-L	7	Wis	2R	——	L4IHVA	—	171	8700	36x8	36x8D
Selden 77	7	7365	Con	L	6	4¾x5¾	611.0	54.1	127@2300	G	Own	Br-L	Spic	Ross	Str	Vac	Aut	Br-L	7	Wis	2R	——	BW4IM	—	178	11600	40x8	42x9D
Service Series S 11	1	1600	Bud	L	6	3⅜x4½	241.6	27.3	53@2200	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Col	Sp	25.5	——	—	142	3900	30x5P	30x5P
Service Series S 11	1½	1900	Bud	L	6	3⅜x4½	241.6	27.3	53@2200	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Tim	Sp	29.2	L4IH	297	162	4300	30x5P	30x5DP
Service Series 40	1½	2990	Bud	L	6	3⅜x5	309.6	31.5	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Tim	Wo	34.8	L4IH	394	168	4700	34x5P	34x5DP
Service Series S 11	2	2030	Bud	L	6	3⅜x4½	241.6	27.3	53@2200	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Tim	Sp	29.2	L4IH	297	162	4500	32x6	32x6D
Service Series 40	2	3240	Bud	L	6	3⅜x5	309.6	31.5	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Tim	Wo	34.8	L4IH	394	168	4900	36x6	36x6D
Service Series 40	2½	3240	Bud	L	6	3⅜x5	309.6	31.5	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Tim	Wo	34.8	L4IH	394	168	5100	36x8P	36x6D
Service Series 60	2½	4580	Bud	L	6	4⅛x5⅛	410.9	40.8	83@2100	G	Long	Ful	Blo	Han	Zen	Vac	Aut	Ful	5	Tim	Wo	63.0	L4IH	584	175	7000	36x6	36x6D
Service Series 60	3	4680	Bud	L	6	4⅛x5⅛	410.9	40.8	83@2100	G	Long	Ful	Blo	Han	Zen	Vac	Aut	Ful	5	Tim	Wo	63.0	——	—	175	7100	36x6	38x7D
Service Series 80	3½	5250	Bud	L	6	4⅛x5⅛	411.0	40.8	83@2100	G	Long	Borg	Blo	Ross	Zen	Vac	Aut	Br-L	7	Tim	Wo	98.2	——	—	175	8200	36x6S	36x12S
Service Series 80	4	5330	Bud	L	6	4⅛x5⅛	411.0	40.8	83@2100	G	Long	Own	Blo	Ross	Zen	Vac	Aut	Br-L	7	Tim	Wo	98.2	——	—	175	8400	36x6S	36x14S
Service Series 100	5	5830	Bud	L	6	4⅛x5⅛	410.9	40.8	83@2100	G	Long	Own	Blo	Ross	Zen	Vac	Aut	Br-L	7	Tim	Wo	95.0	——	—	175	9600	36x6S	40x14S
Stewart 30	1	695	Lyc	L	4	3¾x4½	199.0	22.5	50@2600	G	Fed	Borg	Spic	Ross	Str	P	DR	W-G	4	Sal	Sp	25.1	B4IM	..	130	*3158	20x6.50	20x6.50
Stewart 30X	1	795	Lyc	L	6	3	185.0	23.8	60@2800	G	Fed	Borg	Spic	Ross	Str	P	DR	W-G	4	Sal	Sp	25.1	B4IM	..	130	3199	20x6.50	20x6.50
Stewart 40	1½	895	Lyc	L	4	3¾x4½	199.0	22.5	50@2600	G	Fed	Borg	Spic	Ross	Str	P	DR	W-G	4	Cla	Sp	39.1	B4IM	..	130	3531	20x6.50	20x6.50D
Stewart 40 X	1½	995	Lyc	L	6	3 x4½	201.5	23.8	60@2800	G	Fed	Borg	Spic	Ross	Str	P	DR	W-G	4	Sal	Sp	25.1	B4IM	..	130	3574	20x6.50	20x6.50D
Stewart 34 X	2½	1195	Lyc	L	6	3¼x4½	224.0	25.3	61@2600	G	Own	Borg	Spic	Ross	Str	P	DR	W-G	4	Cla	Sp	25.1	B4IM	..	145	3891	20x6.50	20x6.50D
Stewart 28 X	2	1495	Lyc	L	6	3¼x4½	224.0	25.3	61@2600	G	Own	Ful	Spic	Ross	Str	P	DR	Ful	4	Cla	Sp	44.1	B4IM	..	136	4239	20x6.50	20x6.50D
Stewart 29 X S	2	1695	Lyc	L	6	3⅝x4½	278.0	25.3	85@2750	G	Own	Ful	Spic	Ross	Str	P	DR	Ful	4	Cla	Sp	44.1	B4IM	..	145	4194	32x6	32x6D
*Stewart 18 X	2½	2690	Lyc	L	6	3⅝x5	310.0	31.5	85@2750	G	Own	Ful	Spic	Ross	Str	P	DR	Ful	4	Tim	Wo	48.1	B4IM	..	165	6145	32x6	32x6D
Stewart 32 X	2½	1990	Lyc	L	6	3⅝x4½	278.0	31.5	80@2500	G	Mod	Ful	Spic	Ross	Str	P	DR	Ful	4	Cla	Sp	46.1	B4IM	..	165	5552	32x6	32x6D
Stewart 35 X	3	2590	Lyc	L	6	3¾x4½	299.0	33.8	85@2750	G	Fed	Ful	Spic	Ross	Str	P	DR	Ful	4	Cla	Sp	46.1	B4IM	..	165	6224	20x8.25B	30x8.25D
Stewart 36 X	3	2990	Lyc	L	6	3¾x5	354.0	36.2	90@2750	G	Fed	Borg	Spic	Ross	Str	P	DR	Br-L	4	Tim	Wo	105.1	B4IM	..	165	6864	20x8.25	20x8.25D
Stewart 19 X	3½	3690	Lyc	L	6	3¾x5	354.0	36.2	90@2750	G	Mod	Ful	Spic	Ross	Str	P	DR	Ful	12	Tim	Wo	105.1	B4IM	..	165	7474	34x7	34.7D
Stewart 38-8	2½	3990	Lyc	L	8	3¾x4¾	462.0	44.4	130@2800	G	Fed	Borg	Spic	Ross	Str	P	DR	Br-L	12	Tim	2R	105.1	B4IMV	..	170	7964	20x9.00	20x9.00D
Stewart 38-6	3½	3990	Wak	L	6	4⅝x5⅛	420.0	45.9	100@2000	G	Fed	Borg	Spic	Ross	Str	P	DR	Br-L	12	Tim	2R	105.1	B4IMV	..	170	7964	20x9.00	20x9.00D
Stewart 31 X	5	4930	Wak	L	6	4⅝x5⅛	462.0	45.9	100@2000	G	Mod	Ful	Spic	Ross	Str	P	DR	Ful	8	Tim	Wo	105.1	B4IMV	—	165	9885	36x6S	36x6SD
Stewart 27 X	7	5700	Wak	L	6	4⅝x5⅛	462.0	45.9	100@2000	G	Own	Ful	Spic	Ross	Str	P	DR	Ful	8	Tim	Wo	105.1	B4IMV	—	165	10512	36x7	40x7D
Studebaker S-1	½	595	Own	L	6	3⅛x4⅛	221.0	27.3	70@3200	C	McC	Long	Spic	Ross	Str	P	DR	W-G	3	Own	Sp	16.4	B4IM	148	114	*2897	19x5.25	19x5.25
Studebaker S-20	½	695	Own	L	6	3¼x4⅛	205.0	25.4	70@3200	C	McC	Long	Spic	Ross	Str	P	DR	W-G	4	Tim	Sp	36.2	B4IM	224	130	3044	20x6.00	32x6
Studebaker S-30	1½	775	Own	L	6	3¼x4⅛	205.0	25.4	70@3200	C	McC	Long	Spic	Ross	Str	P	DR	W-G	4	Tim	Sp	36.2	B4IM	224	160	3199	20x6.00	32x6
Studebaker S-40	2	945	Own	L	6	3¼x4⅛	205.0	25.4	70@3200	C	McC	Long	Cle	Ross	Str	P	DR	W-G	4	Tim	Sp	37.4	B4IM	276	136	3825	20x6.50	20x6.50D
Studebaker S-50	2	895	Own	L	6	3¼x4⅛	205.0	25.4	70@3200	C	McC	Long	Cle	Ross	Str	P	DR	W-G	4	Tim	Sp	37.4	B4IM	276	148	3895	20x6.50	20x6.50D
Studebaker S-60	2	945	Own	L	6	3¼x4⅛	205.0	25.4	70@3200	C	McC	Long	Cle	Ross	Str	P	DR	W-G	4	Tim	Sp	37.4	B4IM	276	160	3900	20x6.50	20x6.50D
Studebaker 88	——	3295	Own	L	8	3½x4⅜	337.0	39.2	115@3200	G	Long	Long	Spic	Ross	Str	P	DR	Ful	4	Eat	Sp	24.6	B4IMV	444	184	5413	20x7.50	20x7.50D
Studebaker 99	——	3795	Own	L	8	3½x4⅜	337.0	39.2	115@3200	G	Long	Long	Spic	Ross	Str	P	DR	Ful	4	Eat	Sp	24.6	B4IMV	505	184	5580	20x7.50	20x7.50D
White 15B	*7,500	1545	Own	L	4	3¾x5⅛	226.4	22.5	31@1600	G	Own	Own	Spic	Own	Zen	Vac	L-N	Own	4	Own	Sp	18.6	O2XM	226	133½	3402	30x5	30x5
White 109	*8,000	1700	Own	L	4	4 x5¾	289.0	25.6	45@1800	G	—	Own	Mec	Han	Zen	Vac	DR	Own	4	Own	Sp	19.5	L4IH	276	138	4625	30x5	30x5
White 69	*8,000	1850	Own	L	6	3½x4½	260.0	29.4	54@2100	C	Own	Own	Mec	Han	Zen	Vac	DR	Own	3	Own	Sp	17.8	L4IH	276	138	3739	30x5	30x5D
White 161	*9,000	1850	Own	L	4	4 x5¾	289.0	25.6	45@1800	G	—	Own	Mec	Han	Zen	Vac	DR	Own	4	Own	Sp	19.5	L4IH	276	138	4290	34x7	34x7
White 162	*10,000	1900	Own	L	4	4 x5¾	289.0	25.6	45@1800	G	—	Own	Mec	Han	Zen	Vac	DR	Own	4	Own	Sp	19.5	L4IH	276	138	4360	30x5	30x5D
White 210	*10,000	2300	Own	L	4	4 x5¾	289.0	25.6	45@1800	G	—	Own	Spic	Han	Zen	Vac	DR	Own	4	Own	Sp	22.4	L4IF	349	148	4875	30x5	30x5D
White 61	*10,500	2450	Own	L	6	3¼x4½	299.0	33.7	61@2100	C	Own	Own	Spic	Han	Zen	Vac	DR	Own	4	Own	Sp	23.4	L4IH	349	148	4789	30x5	30x5D
White 611	*11,500	2550	Own	L	6	3¼x4½	299.0	33.7	61@2100	C	—	Own	—	Han	Zen	Vac	DR	Own	4	Own	Sp	23.4	L4IH	349	148	4980	20x7.00B	20x7.00DB
White 211	*11,500	2425	Own	L	4	4 x5¾	289.0	25.6	45@1800	G	—	Own	Spic	Han	Zen	Vac	DR	Own	4	Own	Sp	23.4	L4IH	349	148	5110	32x6	32x6D
White 212	*13,000	2700	Own	L	4	4 x5¾	289.0	25.6	45@1800	G	—	Own	Spic	Han	Zen	Vac	DR	Own	4	Own	Sp	23.4	L4IH	349	148	5230	34x7	34x7D
White 58	*13,000	3125	Own	L	4	4 x5¾	289.0	25.6	45@1600	G	Own	Own	Spic	Own	Zen	Vac	Eis	Own	4	Own	Sp	26.2	O2IM	268	165	6276	36x4	36x7
White 612	*13,000	2800	Own	L	6	3¼x4½	299.0	33.7	61@2100	C	—	Own	—	Han	Zen	Vac	DR	Own	4	Own	Sp	23.4	L4IH	349	148	5100	20x7.50B	20x7.50DB
White 620	*15,000	4350	Own	H	6	4 x5¼	396.0	38.4	72@1800	G	Own	Own	Spic	Ross	Zen	P	DR	Own	4	Own	Sp	41.8	O14IHV	—	157	7300	20x8.25B	20x8.25DB
White 51A	*17,000	3750	Own	L	4	4¼x5¾	326.0	28.9	54@1600	G	Own	Own	Spic	Own	Zen	Vac	Eis	Own	4	Own	Sp	35.6	O2IM	335	170	6438	36x5	36x8
White 51AT	*17,000	3875	Own	L	4	4¼x5¾	326.0	28.9	54@1600	G	Own	Own	Spic	Own	Zen	Vac	Eis	Own	4	Own	Sp	46.6	O2IM	335	134	6227	36x5	36x8
White 621	*18,000	4650	Own	H	6	4 x5¼	396.0	38.4	72@1800	C	Own	Own	Spic	Ross	Zen	P	DR	Own	4	Own	Sp	41.4	O14IHV	—	157	7700	20x9.00B	20x9.00DB
White 610	*20,000	6100	Own	H	6	4⅛x5¾	519.0	45.9	96@1800	C	Own	Own	Spic	Ross	Zen	P	L-N	Own	4	Own	Sp	32.9	O4IA	—	180	9200	20x9.00B	20x9.00DB
White 630	*20,000	5000	Own	H	6	4 x5¼	396.0	38.4	72@1800	C	—	Own	Spic	Ross	Zen	P	DR	Own	4	Own	Sp	41.4	O4IHV	554	168	8500	20x9.00B	20x9.00DB
White 55	*21,500	4650	Own	L	4	4¼x5¾	326.0	28.9	54@1600	G	Own	Own	Spic	Own	Zen	Vac	Eis	Own	4	Own	2R	66.1	OPXM	224	174	8737	36x5	40x5D
White 58	*22,000	4400	Own	L	4	4¼x5¾	326.0	28.9	54@1600	G	Own	Own	Spic	Own	Zen	Vac	Eis	Own	4	Own	2R	49.7	OPXM	224	180	7797	36x5	36x5D
White 631	*24,000	6450	Own	H	6	4⅜x5¾	519.0	45.9	96@1800	C	Own	Own	Spic	Ross	Zen	P	L-N	Own	4	Own	2R	46.9	O4IA	—	180	9700	20.9.75B	20x9.75DB
*White 630 SW200	*24,000	6280	Own	H	6	4 x5¼	396.0	38.4	72@1800	C	—	Own	Spic	Ross	Zen	P	DR	Own	4	Tim	Wo	44.2	OTIHV	—	193	10000	20x8.25B	20x8.25DB
White 631	*24,000	5750	Own	H	6	4 x5¼	396.0	38.4	72@1800	C	Own	Own	Spic	Ross	Zen	P	DR	Own	4	Own	2R	56.9	O4IHV	—	168	9000	20x9.25B	20x9.25DB
White 52	*28,000	5100	Own	L	4	4¼x5¾	326.0	28.9	54@1600	G	Own	Own	Spic	Own	Zen	Vac	Eis	Own	4	Own	2R	58.4	OPXM	224	174	9409	36x6	40x12
White 52T	*28,000	4700	Own	L	4	4¼x5¾	326.0	28.9	54@1600	G	Own	Own	Spic	Own	Zen	Vac	Eis	Own	4	Own	2R	76.8	OPXM	224	129½	8461	36x5	40x5D
White 643	*32,000	6950	Own	H	6	4⅜x5¾	519.0	45.9	96@1800	C	Own	Own	Spic	Ross	Zen	P	L-N	Own	4	Own	2R	66.5	O4IA	—	180	10900	24x10.50B	24x10.50DB
*White 642 SW310	*34,000	8045	Own	H	6	4⅜x5¾	519.0	45.9	96@1800	C	—	Own	Spic	Ross	Zen	P	L-N	Own	4	Tim	Wo	88.6	OTIHV	—	198	12870	20x9.00B	20.9.00DB
White 642	*34,000	6750	Own	H	6	4⅜x5¾	519.0	45.9	96@1800	C	Own	Own	Spic	Ross	Zen	P	L-N	Own	4	Own	2R	66.5	O4IA	—	180	10600	24x9.75B	24x9.75DB
*White 643 SW410	*40,000	8570	Own	H	6	4⅜x5¾	519.0	45.9	96@1800	C	—	Own	Spic	Ross	Zen	P	L-N	Own	4	Tim	Wo	69.9	OTIHV	—	198	14400	40x8	40x8D
**White 60K	——	2200	Own	L	6	3½x4½	260.0	29.4	54@2100	C	—	Own	Mec	Han	Zen	Vac	DR	Own	3	Own	Sp	17.6	L4IH	276	112	4200	20x7.00B	20x7.00B
White 601	——	1900	Own	L	6	3½x4½	260.0	29.4	54@2100	C	—	Own	Mec	Han	Zen	Vac	DR	Own	4	Own	Sp	19.5	L4IH	276	138	3825	20x7.00B	20x7.00B
White 602	——	2050	Own	L	6	3½x4½	260.0	29.4	50@1800	C	—	Own	Mec	Han	Zen	Vac	DR	Own	4	Own	Sp	19.5	L4IH	276	138	4125	20x7.50B	20x7.50B
Willys 6-C-113	½	395	Own	L	6	3¼x3⅞	193.0	25.3	65@3400	C	Fed	Borg	Spic	Own	Til	P	Aut	Own	3	Own	Sp	12.4	B4IM	143	113	1923	19x5.00	19x5.00
Willys 6-C-131	1½	595	Own	L	6	3¼x3⅞	193.0	25.3	65@3400	C	Fed	Borg	Spic	Own	Til	P	Aut	W-G	4	Cla	Sp	40.8	B4IM	235	131	2625	20x5.50	32x6
Willys 6-C-157	1½	630	Own	L	6	3¼x3⅞	193.0	25.3	65@3400	C	Fed	Borg	Spic	Own	Til	P	Aut	W-G	4	Cla	Sp	46.8	B4IM	235	157	2900	20x5.50	32x6

GENERAL NOTATIONS

***REFERENCE MARKS** apply to individual lines only and explanations are given under the subdivision for each company in the "SPECIAL NOTATIONS."

CAPACITIES given in this table are in tons or fractions of tons. *Shows maximum allowable gross weight in pounds.

ENGINE—Bud, Buda; Con, Continental; Her, Hercules; Lyc, Lycoming; Pont, Pontiac; Wak, Waukesha; Wis, Wisconsin; Hall, American Car & Foundry.

VALVE ARRANGEMENT—L, "L" head; H, in head; O, overhead; T, T head; S, sleeve.

TYPE OF CAMSHAFT DRIVE—G, gear; C, chain.

RADIATOR MAKE—G & O, G & O Mfg. Co.; Per, Perfex Corp.; Long, Long Mfg. Co.; Har, Harrison Radiator Corp.; Fed, Fedders Mfg. Co.; McC, McCord Radiator & Mfg. Co.; Mod, Modine Mfg. Co.; Hex, Hexcel Radiator Co.

CLUTCH MAKE—Jon, Jones Clutch & Gear Co.; Ful, Fuller & Sons Mfg. Co.; Borg, Borg & Beck Co.; Br-L, Brown Lipe Gear Co.; Rock, Rockford Drill & Machine Co.; Cov, Covert Gear Co.; Long, Long Mfg Co.; Detr, Detroit Gear & Machine Co.; Mer, Merchant & Evans; Hel, Merchants & Evans.

UNIVERSALS MAKE—Spic, Spicer Mfg. Co.; Blo, Blood Bros. Machine Co.; Sup, Superior Universal Products; Un, Universal Products Co.; Cle, Cleveland Steel Products Corp.; Pet, Peters; Opt, Optional; Mec, Mechanics Machine Co.

STEERING GEAR MAKE—Ross, Ross Gear & Tool Co.; Han, Hannum Mfg. Co.; Sag, Saginaw Steering Gear Co.; Gem, Gemmer Mfg. Co.; Col, Columbus Gear & Pump Co.; W-G, Warner Gear Corp.

CARBURETOR—Car, Carter; Mar, Marvel; Sch, Wheeler-Schebler; Str, Stromberg; DL, Detroit Lubricator; Til, Tillotson; Zen, Zenith-Detroit.

FUEL FEED—Gra, gravity; Vac, vacuum tank; P, fuel pump.

ELECTRICAL SYSTEM—AB, American-Bosch; Aut, Electric Auto-Lite; Eis, Eisemann; L-N, Leece-Neville; NE, North East; RB, Robert Bosch; DR, Delco-Remy.

TRANSMISSION—Br-L, Brown-Lipe; Cov, Covert; Ful, Fuller; Mec, Mechanics Machine; Mun, Muncie; W-G, Warner Gear; Col, Cotta Gear Co.; Cla, Clark Equipment Co.

REAR AXLE, Cla, Clark Equipment; Col, Columbia; Eat, Eaton; Pont, Pontiac; Sal, Salisbury; Tim, Timken; Wis, Wisconsin.

FINAL DRIVE—IG, internal gear; St, straight bevel; Sp, spiral bevel; Wo, worm; 2R, double reduction; Ch, chain; S-T, semi-transverse.

TYPE OF SERVICE BRAKES—B4IM, Bendix, 4 wheel, internal mechanical; B6IA, Bendix, 6 wheel, internal air; B4IMV, Bendix, 4 wheel, internal mechanical, vacuum; BrIA, Bendix, operating on 4 rear wheels, internal air; BW4IM, Bendix front, Wisconsin rear, 4 wheel internal, mechanical; BE4IM, Bendix front, Eaton rear, 4 wheel, internal mechanical; BO4IM, Bendix front, own rear, 4 wheel internal mechanical; B4IH, Bendix, 4 wheel, internal hydraulic; B4, Bendix, 4 wheel.

C4IM, Columbia, 4 wheel, internal, mechanical; K2IM, Clark, 2 wheel, internal, mechanical.

L4IHVA, Lockheed, 4 wheel, internal, hydraulic, vacuum, air; LO4ID, Lockheed, own, 4 wheel, internal, drive shaft; LO4IV, Lockheed, own, 4 wheel, internal, vacuum; LT4DV, Lockheed Timkin, 4 wheel, drive shaft, vacuum; L4IH, Lockheed, 4 wheel, internal, hydraulic; L4IHV, Lockheed, 4 wheel, internal hydraulic, vacuum; LT4IVA, Lockheed, Timken, 4 wheel, internal, vacuum, air; L6IHV, Lockheed, 6 wheel, internal, hydraulic, vacuum; L6IH, Lockheed 6 wheel, internal, hydraulic.

O2IM, Own, 2 wheel, internal, mechanical; O2IV, Own, 2 wheel, internal, vacuum; O4IA, Own, 4 wheel, internal, air; O4IM, Own, 4 wheel, internal, mechanical; O4IV, Own, 4 wheel, internal, vacuum; O4M, Own, 4 wheel, mechanical; O2XM, Own, 2 wheel, external, mechanical; O4XM, Own, 4 wheel, external, mechanical; OJXM, Own, jack shaft, external, mechanical; OL4IH, Own, Lockheed, 4 wheel, internal, hydraulic; OPX, Own, propeller shaft, external; OPXM, Own, propeller shaft, external, mechanical; OPM, Own, propeller shaft, mechanical; ORIV, Own, rear wheels, internal, vacuum.

S4IM, Steeldraulic, 4 wheel, internal, mechanical.

T4rIA, Timken, operating on 4 rear wheels, internal, air; T4IA, Timken, 4 wheel, internal, air; T6IA, Timken, 6 wheel, internal, air; T2IMV, Timken, 2 wheel, internal, mechanical, vacuum.

W4I, Westinghouse, 4 wheel, internal; W4IA, Westinghouse, 4 wheel, internal, air. W6IA, Westinghouse 6 wheel, internal, air. 4IA, 4 wheel, internal, air; 4IH, 4 wheel, internal, hydraulic; 4M, 4 wheel, mechanical.

WHEEL BASES given are standard, but optional wheel bases are available in many cases.

***CHASSIS WEIGHT** according to Automotive Daily News formula, which is the chassis with gas, oil, water and spare tire, but without cab or other equipment.

TIRES—B, balloon; D, dual; S, solid; P, pneumatic.

SPECIAL NOTATIONS

AMERICAN-LA FRANCE

*Chief model also available as 2½-ton model, 34x7 tire, dual rear; weight, 6,400. Price, $3,900.

Chieftain model also available as dump truck, 160-inch wheel base.

Balloon tires optional on Chief, Chieftain and Big Chief models.

AUTOCAR

*Engines in these models are located under the driver's seat.

BROCKWAY

*Six-wheelers.

CHEVROLET

Utility model available on 131-inch wheel base with chassis weight of 2,760 pounds and equipped with dual rear wheels.

DAY ELDER

*Six-wheeler.

Additional standard wheel bases are available on different models as follows:

85.....146, 168 — 240.....204
110.....168, 186 — 285.....204
139.....163, 187, 193 — 345.....204
160.....165, 180, 204 — 402.....204

DODGE

*Models F40, F41, F61 and F62 can be had with double drop frame.

DIAMOND T

*Six-wheelers.

Additional standard wheel bases available as follows:

551.....158 — 750.....167, 192
504.....168½ — 801.....180½, 199¼
506.....174 — 1200.....174½, 180
603.....157, 179 — 1600.....174½, 190
606.....177½ — 1601.....184

F. W. D.

*Indicates six-wheel model.

The BTL and BT models are special line construction trucks in which complete provision for mounting AT and T earth boring machine, winch, body and other line construction accessories is included in the standard chassis.

Special power take-off transmission, which provides 3 power take-offs which may be operated in any transmission speed, optional on all models.

FEDERAL

*Six-wheelers.

†Solid tires standard, no spare rim or tire.

GRAMM

Series	Straight Rating	Wheel Base		Pay Load Range
AX 4	8,000	157	1	to 1½ tons
AX 6	8,000	157	1	to 1½ tons
BX 4	10,000	157	1½	to 2 tons
BX 6	10,000	157	1½	to 2 tons
CX 4	12,000	157-180	2	to 3 tons
CX 6	12,000	157-180	2	to 3 tons
B	12,000	157-174	1¾	to 2½ tons
C	14,000	145-196	2	to 3 tons
D	17,000	145-196	2½	to 4 tons
E	20,000	145-196	3	to 4½ tons
EY			3	to 4 tons
GY			4	to 5 tons
GW	28,000	157-240	5	to 7½ tons
HY			5	to 6½ tons

†Both the four and six cylinder are also offered in 157-inch wheel base at $1,145 and $1,345, respectively.

GENERAL MOTORS TRUCK

*Capacity indicated is the Straight Rating (combined weight of chassis, body, equipment and pay load) for which each chassis is designed and guaranteed to satisfactorily operate under average conditions. The size of the tires used does not affect this Straight Rating, but to secure maximum tire mileage it is suggested that the total gross weight be limited to a "recommended gross weight" for each tire equipment based on tire capacity. Prices cover base chassis and vary with wheel base and tire combinations. The number of wheel base lengths, tire types, range of "recommended gross weights" and resulting pay load range (assuming nominal body allowance) for each model follows:

Note: Models T-15 to T-60, inclusive, are available for export only as coach chassis.

Model	Wheel Bases	Tire Types	Range of Rec. Gross Weights	Pay Load Range
T-11	1	1	3900	½
T-15	3	10	4500- 6500	½-1½
T-17	2	8	5500- 6500	1-1½
T-19	3	22	6500- 8500	1½-2
T-25	3	17	6800- 9000	1½-2
T-26	4	..	8500-11000	2-3
T-30	3	16	10000-12500	2-3
T-31	4	..	11000-14000	2½-4
T-42	4	12	12000-15000	2½-4
T-44	4	12	12000-16000	3-4½
T-51	4	..	16500-19000	4-5½
T-55	4	..	16500-19000	4-5½
T-60	4	18	18500-22000	5-6½
T-61	4	..	19500-22000	5-6½
T-82	4	12	19000-24000	5-7
T-83	4	..	20000-24000	5-7
T-85	3	..	22000-26000	5-7
T-90	3	7	22000-28000	5-7½
T-95	3	..	28000-34000	7-9
T-96	3	..	28000-34000	7-9

†Models T-90, T-95 and T-96 are six-wheelers, the latter having one driven and one trailing axle. Optional rear axle gear ratios available for all models. Double reduction axles available for Models T-60, T-61 and T-82.

INDIANA

*Six-wheelers.

MACK

Other wheel bases furnished on all truck models.

On 6-wheel jobs 4 rear wheels driven by chains, foot brake on 4 rear wheels.

††Made also in tractor models.

PAIGE

*Price includes panel or screen body. †Chassis weight given does not include gas, water, etc.

PIERCE-ARROW

*Optional final drive on Models PW, PX, PY and PZ.

REO

Models DF 129, DF, FA, FE and FF are available with duel wheels at additional cost.

*Models DF129 and DF 135 can be had with either 3 or 4 speed transmission.

SELDEN

Additional standard wheel bases are available on different models as follows:

Model 37C..... — 162 and 181
39C..... — 177 and 190½
47CB, 47CD.....151, 164 and 184
67C.....151, 164, 184 and 198

STEWART

Models 30 and 30X can also be supplied in 110, 120, 140 and 160-inch wheel base.

Models 40 and 40X can also be supplied in 110, 140 and 160-inch wheel base.

*Models 34X can be supplied in 135, 145, 160 and 176-inch wheel base.

Model 28X can be supplied in 130, 145, 160 and 176-inch wheel base.

Model 29XS can be supplied in 135, 160 and 176-inch wheel base.

*Models 18X, 32X and 36X can be supplied in 148, 190 and 220-inch wheel base.

*Models 19X, 31X and 27X can be supplied in 148, 172, 190, 220 and 235-inch wheel base.

As optional equipment Models 18X, 19X, 35X, 31X and 27X can be supplied with Timken dual reduction rear axle.

Models 38-8 and 38-6 can be supplied in 150, 160, 170, 196, 226 and 241-inch wheel base and worm axle.

STUDEBAKER

Maximum gross load, chassis, body and pay load for Model 88 is 12,500 pounds and for Model 99 is 14,000 pounds.

†Hand brake same as foot brake, standard. Hand brake on drive shaft, special equipment.

WHITE

*Six-wheelers.

**Price on Model 60K includes body.

$52,827,797 Net Earnings Of G. M. in Second Quarter

(Continued from Page 2)

earnings for the second quarter were 3.3 per cent. above operating earnings for the corresponding period a year ago. Total sales of cars in units by the corporation to its dealers exceeded the corresponding item of a year ago by 6.1 per cent. While progress has been made in injecting into the corporation's operations further operating economies, the influence on net profits has been offset by the shift of demand to lower priced units, reflecting the general circumstances prevailing during the period under review.

Sales of the automotive industry as a whole to consumers in the United States were approximately

Increasing Profits From Bakery Deliveries

This report on economical truck operation in the bakery field was prepared by the General Motors Truck Company, Pontiac, Mich., and appears in serial form in Automotive Daily News. Copies of this report in pamphlet form are now available at all General Motors Truck Company dealer and distributorships.

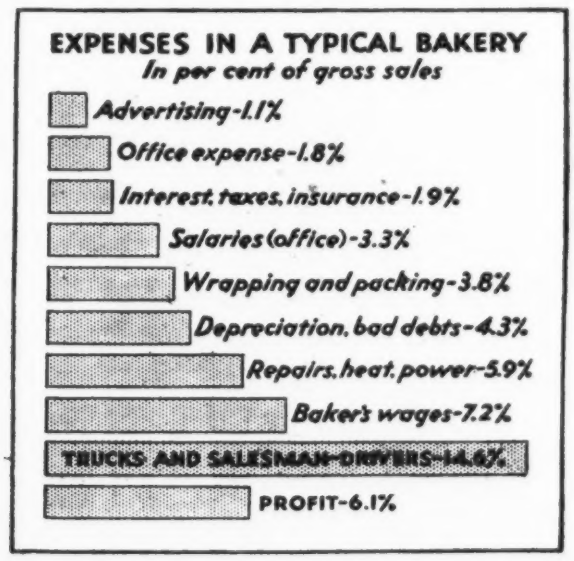
TRUCK operation is one of the most vital phases of the wholesale baking business. There are two reasons why this is true:

1. The baker's salesman drives his trucks. And effective results from sales time and effort are dependent in a large measure on sound truck operation.

2. As the accompanying chart shows, distribution expense—which is made up largely of the cost of trucks and driver-salesman—is the largest single bakery expense, with the exception of the cost of raw materials. For every dollar of profit earned by the average bakery, two to three dollars are paid out for truck operation.

The fact that the truck and the salesman operate as a unit is a factor of greatest importance to the baker. The salesman-driver's sales depend to a considerable extent on the amount of time he has available for selling. That is why the effectiveness of his sales effort depends a great deal upon the intelligent thought and planning behind truck operation.

Again, the cost of truck operation determines to a large extent the profit possibilities of the baker's entire business. Some bakers have been inclined to concentrate their efforts at economy principally on lower production costs. Such effort is laudable and should be continued. But no single factor in the baker's business has a more direct bearing on his profits than does his management of trucks and driver-salesmen. Only efficient production plus sound management and direction of trucks and driver-salesmen can spell maximum profits.



Better Truck Management Needed

There are many successful bakers who understand clearly the essential fact that sales accomplishment and delivery accomplishment are closely allied and must be treated as a single problem in order to get economical handling of the whole problem of distribution of their product. But the survey which preceded the preparation of this report showed clearly that the great majority of bakers are operating trucks and directing salesmen in such a way that distribution cost constantly threatens profits and frequently creates definite loss.

The major opportunity for increased profits in the bakery business lies in the direction of lower distribution expense. And lower distribution expense can only be had by better management of trucks and driver-salesmen.

The baker who determines to lower his cost of distributing his baked goods is confronted at once with a number of serious and seemingly insurmountable problems. His distribution expense is made up, in the main, of two kinds:

Truck investment and operating expense.

Commissions and salaries to driver-salesmen.

The simplest way to reduce that expense, of course, is to reduce the number of trucks operated, cut salaries and commissions or otherwise make direct slashes in expenditures for distributing purposes. But any such drastic action, without thought and planning, can only defeat its own purpose. For it can mean just one thing—loss of sales volume through impaired delivery service and decreased sales effort. Distribution expense is costly and uneconomical only when it is high in proportion to the total profit on sales. And any economies which decrease sales are likely only to lower the total sales volume without changing in the least the relationship between distribution costs and net profits.

The only type of effort that will both lower distribution cost and increase net profits is effort that is designed both to increase present sales volume and lower the cost of delivery to each individual customer. And it is by means of exactly this type of constructive effort that some bakers were found, during this survey, to be operating far more profitably than others.

Three Types of Better Management Needed

Of course, the factors that control truck and salesman-driver expense vary with individual bakers. The frequency of delivery demanded by competitive conditions, the physical nature of the territory in which the baker operates, the extent and the buying power of his trading area— these and other factors enter into his cost of distribution. But the fact remains that, when all such variables are taken into consideration, some bakers are distributing their bread, cake and other products at a proportionately lower cost per 100 pounds of goods, per mile of operation, and per order delivered.

For example, the accompanying chart tells the story of two leading bakers in a Middle Western city whose product and volume are closely comparable and whose trading area is almost identical. And yet the difference in their total cost of distribution is such that one of these bakers consistently shows an annual profit several thousand dollars higher than his competitor.

Such variations occur throughout the baking industry. And careful study shows that those bakers who are distributing their product most profitably are doing so for three reasons:

1. Better management of truck operation.
2. Better direction of sales and distribution effort.
3. More careful, systematic truck buying.

The purpose of this report is to bring to the entire baking industry the methods and practices which successful bakers are applying along these three lines.

(TO BE CONTINUED.)

DISTRIBUTION COSTS MAKE OR BREAK PROFITS

	Gross sales	Distribution cost	Profit (1929)
Baker A.....	$570,000	$79,980	$40,470
Baker B.....	567,000	84,950	34,534

These bakers, with a closely comparable set-up, show a marked difference in profit. Careful study of their records shows that A's higher profit is almost directly traceable to lower distribution cost.

Truck Safety, Courtesy Aim Of Chamber of Commerce In North Hudson Campaign

UNION CITY, N. J., July 23.—**Safety and courtesy in the operation of motor trucks constitute a goal toward which most of the members of the Chamber of Commerce of northern Hudson county are actively striving and the extent of the work which is being done in this direction is greater than the public realizes, according to Arthur H. Andrews, executive vice-president of the chamber.**

He gives some very significant figures as the result of a survey recently completed by the North Hudson safety committee of the chamber, co-operating with the motor truck committee of the National Automobile Chamber of Commerce.

"Of those reporting in the survey of safety work and driver training," said Mr. Andrews, "88 per cent. are doing something to encourage better driving. Driver training systems are operated by 38 per cent. In terms of trucks they operate the showing is even better, for 65 per cent. of the trucks are operated under driver training systems and 98 per cent. of the trucks are operated by those who are trying in some way to make their drivers careful and courteous."

The survey showed, in general, that it is the practice among members of the Chamber of Commerce of northern Hudson county to select their drivers according to some prescribed qualifications, to carefully train new drivers and to reward good performances by bonuses, salary increases or some other effective means. On the other hand, poor performance is generally penalized either by suspension or dismissal or in some other way. Printed rules for safe driving are posted, and drivers are required to make prompt records of accidents on special forms provided for that purpose.

The survey showed that the efforts to promote safety and courtesy in North Hudson compare favorably with work which is being done in other sections. For instance, 65 per cent. of the trucks in the North Hudson survey are operated under driver training systems. The percentage for the whole county is 67. Locally, 85 per cent. of the trucks are driven by men who were selected by prescribed qualifications. The national percentage is only 74. Other interesting comparisons are:

Doing something to encourage better driving, North Hudson 98 per cent.; national, 98 per cent.; instructing new drivers, North Hudson, 78 per cent.; national, 84 per cent; rewarding good performance, North Hudson, 20 per cent.; national, 56 per cent.; penalizing poor performance, North Hudson, 94 per cent.; national, 85 per cent.; posting safety rules, North Hudson, 74 per cent.; national, 70 per cent.

Figures on the number of accidents in the first half of 1930 showed that, among the members of the chamber, the ratio was one accident to 23,749 miles of operation, compared with the national average of one accident to 16,273 miles.

The majority of those reporting in the survey agreed that driver training not only reduces accidents, but other operating costs as well, and increases business by the building of good will.

Commenting upon the results of the survey, both in North Hudson and the country at large, Mr. Andrews said:

"Motor truck drivers as a class are not reckless and discourteous. That poor driving is the exception rather than the rule and that the operation of trucks over the highways is most carefully supervised—probably more so than with any other class of vehicles—are clearly indicated in the early returns of the national survey.

"Our organization has been cooperating along with motor truck associations, chambers of commerce, trade associations and safety councils throughout the country and I have just received this report: That there have been 2,099 fleet owners heard from, operating a total of 70,644 motor trucks."

Co-ordination of Nation's Transportation Advocated

(Continued from Page 4)

common carriers and revert to some other class of service.

"It therefore seems that under existing conditions we cannot very well deal with the motor truck question in the comparatively simple manner with which passenger buses can be dealt with. It does, however, seem reasonable to point out this much: that the primary purpose for which our highway system exists, and is being extended, at the taxpayers' expenses, is for purposes which may be designated as those of pleasure and convenience, and not those of heavy commercial transportatinon.

"It is pertinent also to inquire to what extent the costs of highway construction and maintenance are increased to meet the needs of a relatively small number of very heavy commercial vehicles; whether the resulting burdens and diversion of the general purchasing power of the country from other channels into the building of unnecessarily expensive highways are really good things for the nation from the economic viewpoint; whether the burdens of highway building and upkeep are fairly apportioned between the ordinary passenger automobile and the heavy commercial truck.

"When we arrive at carefully thought out answers to such questions as these we will be in a better position to deal with the control of the commercial motor truck, and particularly the extremely heavy vehicle designed to perform mass transportation upon highways, which most people think of as being intended for moderate sized vehicles of 'pleasure and convenience.'

"One of the great injustices done to the railroads has been to bar them from the use of the Panama Canal, since the date of its opening in 1914, nothwithstanding the fact that, as the largest taxpayers in the nation, they have been the principal contributors to its construction and maintenance.

"There is no reason why the railroads should not be free to use the canal, or the inland waterways, upon the same terms as citizens generally. Amendment of the Panama Canal act, which is urgently needed, would not only give the railroads the right to use that waterway, but would restore to them the rights which the act also took away from them to participate in intercoastal shipping and in shipping on the Great Lakes.

"It is interesting to look into the future, and twenty years ahead is by no means too far to look when considering policies with reference to matters so important as transportation. It may be assumed that three major developments will be involved in this period:

(a) The actual carrying out of consolidations of the railroads as contemplated under the transportation act of 1920. While the public interest urgently requires this to be done, it is most important to realize that enactment of supplementary legislation is necessary to enable it to be brought about effectively.

"Few persons question the desirability of integrating our rail systems into a comparatively small number of large, financially strong groups capable of assuring to the country the continuance of the maximum degree of progress in the further development of transportation. In addition, it may be conceded that, if there is any possibility at all of reducing the future cost to the public of rail transportation, a scientifically worked out scheme of consolidation must necessarily enter into the very groundwork of the plan. Therefore, such further legislation as may be required, beyond that contained in the transportation act, should be properly considered and enacted by Congress.

"(b) Co-ordination between the various forms of transportation, together with the enactment of legislation essential to permit the bringing of this about.

"The rights now enjoyed, and increasingly availed of, by the railroads, to participate in highway and airway transport, should not only be carefully safeguarded, but enlarged and amplified, as necessity and the growth of these supplementary services may require. Similarly, there is much justification for saying that the railroads should be given the right to engage in pipe line transportation if in the future it should seem desirable to include that form of service within the scope of their activities.

"The railroads of tomorrow will be well-integrated, rounded-out enterprises, ready to serve the public with any means of transportation for which there is a real demand, and which can be rendered upon a sound economic basis. This covers not only service by the rails, but also on the highways, the seas, the Great Lakes, the inland waterways and in the air. Congress and the state legislatures will best serve the public by facilitating this natural process of co-ordinating our newer forms of transport around the railroads as a nucleus.

"(c) A third step will be the internal reorganization of the railroads to equip them for properly performing the functions of general carriers. We may, for instance, look forward to the time when on the staff of a division superintendent there will not only be a trainmaster supervising the operations of trains, but also a roadmaster supervising the operation of buses and trucks, a boat or shipmaster supervising the operations of water transportation, and an airmaster supervising the operation of the air transport enterprises in which the railroad employing him is engaged.

"There seems no reason to think that this is merely a fanciful picture or an extravagant vision of the future. It appears to be merely the logical development of railroads into general carriers, meeting every need of transportation."

The Automotive Daily News does not by any means agree with all Mr. McFadden's points of view, but presents this somewhat abridged version of his speech because it believes that he has brought up some interesting points on the co-ordination of our entire transportation system. —The Editor.

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